TM-941

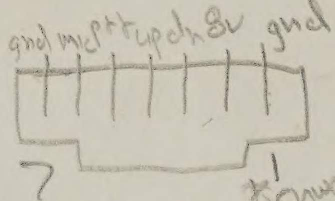
HP-MT

MICROWAVE

State of California
Telecommunications
RADIO MAINTENANCE
Records

HP-MT

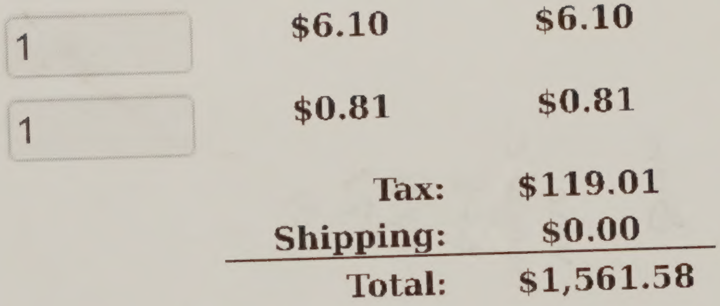
up	red	sql	8
8v	brn	gnd	7
gnd	yel	mic	6
ptt	grn	gnd	5
gnd	blk	ptt	4
mic	wht	af	3
rd	gry	up/down	2
down	blu	+8	1



Conversion for
Kenwood mic
to Icom IC706

	Kenwood	Icom
1	yel	brn
	brn	blu
	blu	wht
	red	red
	grn	blk
	wht	yel
7	blk	grn

RJ-45		mc-45DM	function
Telco	Cat5	Kenwood	
blu	wht/org	blu	dwn
org	org		
blk	wht/grn	clr	mic
red	blu	shd	mic-c
grn	wht/blu	red	ptt
yel	grn	blk	gnd
brn	wht/brn	yel	+8v
gry	brn	grn	up



1	$6.10	$6.10
1	$0.81	$0.81
	Tax:	$119.01
	Shipping:	$0.00
	Total:	$1,561.58

MULTI-FUNCTION MICROPHONE WITH DTMF

MC-52DM/MC-53DM

INSTRUCTION MANUAL

KENWOOD

KENWOOD CORPORATION

©B62-0601-00 (M)(J)
09 08 07 06 05 04 03 02 01 00

OPERATING CONTROLS

① and ② **UP/DWN buttons**
These buttons are used to step up or down the VFO frequency or memory channel. The frequency will change continuously if the buttons are pressed and held.

③ **PTT (Push-To-Talk) switch**
The transceiver will be placed into transmit whenever this switch is pressed. Pressing this switch will also clear the scan mode.

Refer to the Instruction Manual provided with the transceiver for a description of the following keys:

④ **Call key**

⑤ **VFO key**.

⑥ **MR key**

⑦ **PF (Programmable Function) key**

⑧ **16-Tone DTMF (Dual Tone Multiple Frequency) keypad**
These keys are used to activate the DTMF encoder that is built into the microphone. Refer to the Repeater Section of the transceiver's Instruction Manual for additional information on these keys.

⑨ **Lock switch**
This switch will disable all functions of the microphone except the PTT switch and DTMF keypad.

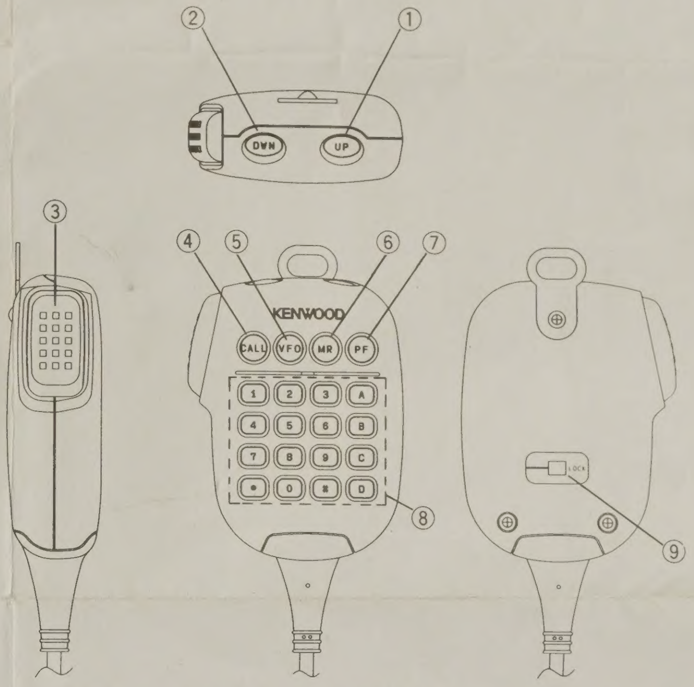
⑩ **Microphone plug**

Note: *Keys ④ to ⑧ described above may not function when using these microphones with some transceivers. Refer to the Instruction Manual provided with your transceiver.*

SPECIFICATIONS

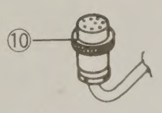
Type	Electret capacitor
Power requirement	8.0 V DC ±10%
Current drain	25 mA or less
Dimensions (WxHxD)	65 x 90 x 30 mm
Weight	Approx. 180 g
Sensitivity	–70±4 dB (0 dB = 1 V/µbar)

PTT sw KS70-0465-08

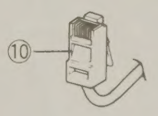


MC-52DM/ MC-53DM

MC-52DM

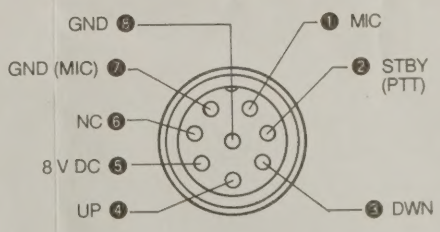


MC-53DM

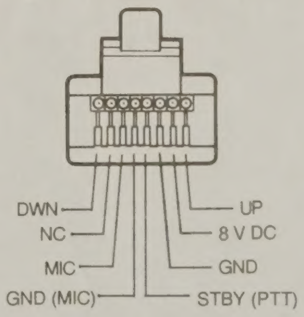


Connector End View

MC-52DM



MC-53DM



DTMF付多機能ハンドマイクロホン

MC-53DM

取扱説明書

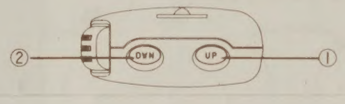
KENWOOD
株式会社 ケンウッド
KENWOOD CORPORATION
本社：東京都渋谷区道玄坂1-14-6　〒150

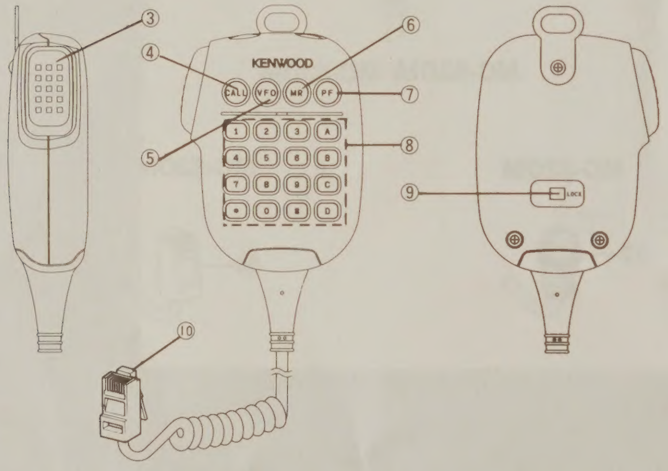
お買い上げいただきましてありがとうございました。

■定格

形式	エレクトレット・コンデンサ型マイクロホン
感度	−70±4 dB
電源電圧	8.0 VDC±10%
消費電流	25 mA以下
寸法	65(幅)×90(高さ)×30(奥行)
重量	約180g

■機能と名称





①②UP/DWN（アップ／ダウン）スイッチ
送受信周波数、メモリーチャンネル、周波数ステップ、トーン周波数をアップまたはダウンさせるスイッチです。押し続けると連続して変化します。
また、スキャンの方向が選択できます。

③　PTT（プッシュ・トウ・トーク）スイッチ
押している間、送信状態になります。
また、スキャン、周波数ステップの選択、トーン周波数選択中にこのスイッチを押すと、その動作が解除されます。

④　CALLキー
トランシーバー本体の取扱説明書をごらんください。

⑤　VFOキー
トランシーバー本体の取扱説明書をごらんください。

⑥　MRキー
トランシーバー本体の取扱説明書をごらんください。

⑦　PF（プログラマブル・ファンクション）キー
トランシーバー本体の取扱説明書をごらんください。

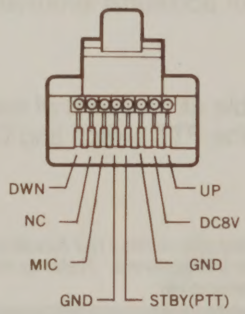
⑧　DTMFキー
PTTスイッチを押し（TXインジケーターが点いていることを確認し）ている間DTMFキーが動作します。
PTTスイッチを押しDTMFキーを押すと、PTTスイッチがOFFの状態になっても約0.7秒間は送信状態を保持します。

⑨　LOCKキー
PTTスイッチ以外のマイクロホンのすべてのキーは動作しなくなります。

⑩　マイクロホン端子

ご注意
④～⑧の機能は、トランシーバーによっては動作しないことがあります。詳細は、トランシーバー本体の取扱説明書でお確かめください。

■マイクロホン端子接続図



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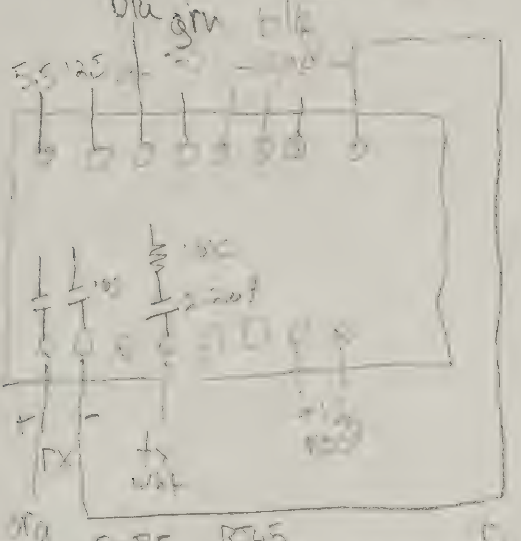
電話　(03)3477-5335
(土、日、祝祭日および当社休日は休ませていただきます。)

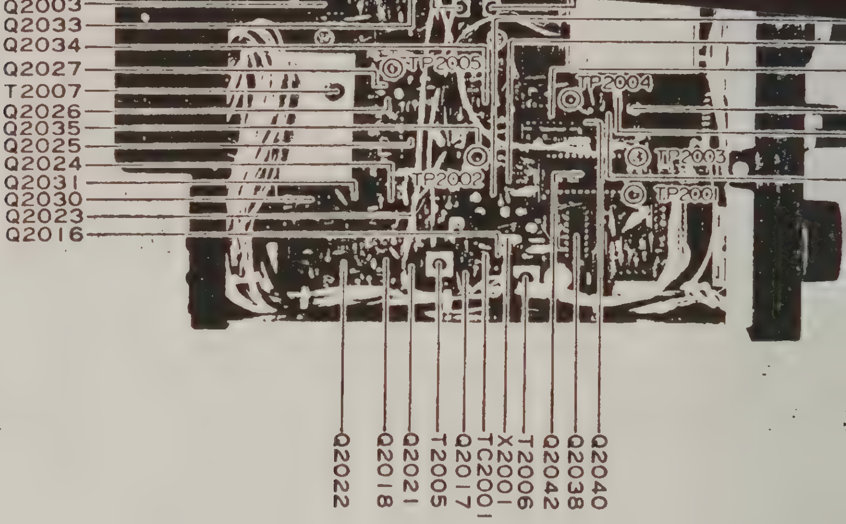
Radius C100



PF=band up

		RJ45 Block
grn	for PF 100K	blue
blu	PTT	grn
whir	tx	blk
org	rx	org

blk —gnd— yel


Q2003
Q2033
Q2034
Q2027
T2007
Q2026
Q2035
Q2025
Q2024
Q2031
Q2030
Q2023
Q2016
TP2005
TP2004
TP2003
TP2002
TP2001
Q2022
Q2018
Q2021
T2005
Q2017
TC2001
X2001
T2006
Q2042
Q2038
Q2040

TM-941A REPEATER CROSS-BAND MODIFICATION (PRELIMINARY)

To operate the TM-941A in the repeater cross-band mode, chip resistor R58 on the Control unit (X53-3310-00) (A/2) must be removed.

This modification requires the ability to desolder a surface mounted micro-miniature chip resistor from the Control board. Seek qualified assistance to avoid damaging the transceiver.

MODIFICATION PROCEDURE

1. Disconnect the power supply and antenna from the transceiver.
2. Remove the bottom cover from the transceiver.
3. Desolder and remove the blue colored chip resistor (R58) from the Control board. Use a wedge shaped soldering tip so you can melt the solder on both sides of the resistor at one time.
4. Install the bottom cover and connect the transceiver to the antenna and power supply.

OPERATING PROCEDURES

The repeater cross-band operation allows the TM-941A to receive on one band and re-transmit the signal on another band. The third band will still be able to receive, but will not be involved in the repeater cross-band operation.

1. Set transceiver to the desired operating frequencies.
2. Adjust the squelch controls to threshold.
3. You may want to set the Time-Out Timer to 3 minutes to protect the transmitter (page 23 of instruction manual).
4. Select one of the three bands to be involved in the repeater cross-band operation by pressing the BAND SELECT key for that band. The PTT indicator will light in the display by this band.
5. Select another band to be involved in the repeater cross-band operation by pressing the CONTROL SELECT key for that band. The green light on the key will illuminate.

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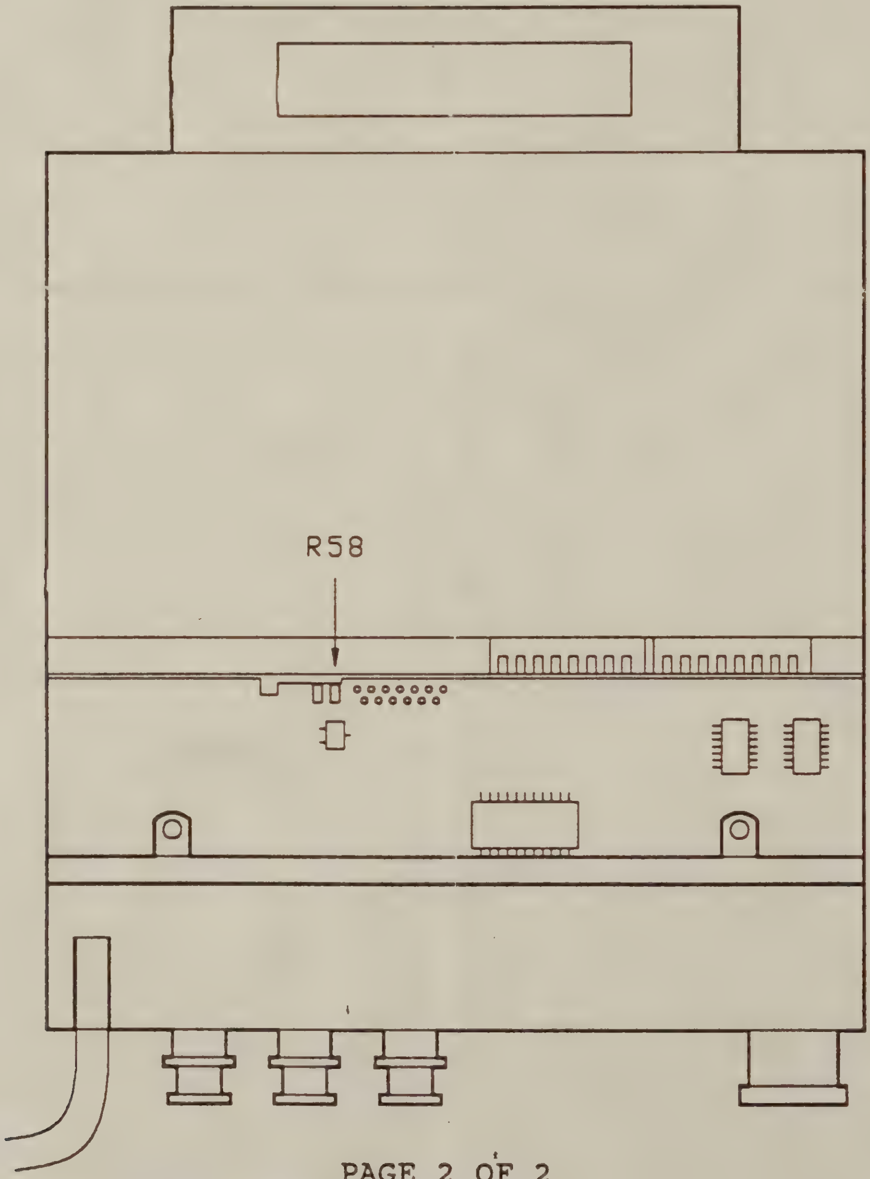
NOTE:

Although it has not been confirmed, if step 5 is skipped, the transceiver should work in a FIXED BAND operation. In this condition, the band selected in step 4 will be dedicated to re-transmitting the received signals from the other two bands. The band selected in step 4 would not be able to pass it's received signals to another band for re-transmission (one way repeat).

6. To turn the repeater cross-band function on or off, press the F key for longer than one second and then press the mute key.

The following functions have not been confirmed at this time, but it appears that:

A. Both bands can contain shift information.
B. Only one band can include an encode/decode tone.



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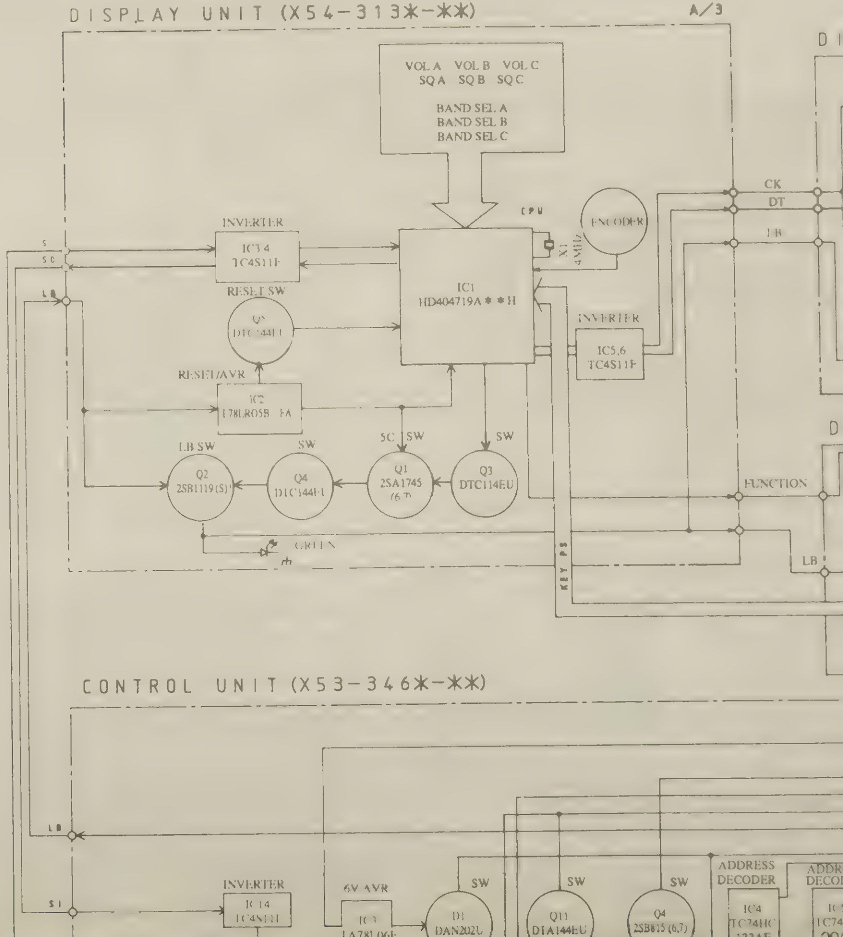
TM-642A BLOCK DIAGRAM



NOTE:

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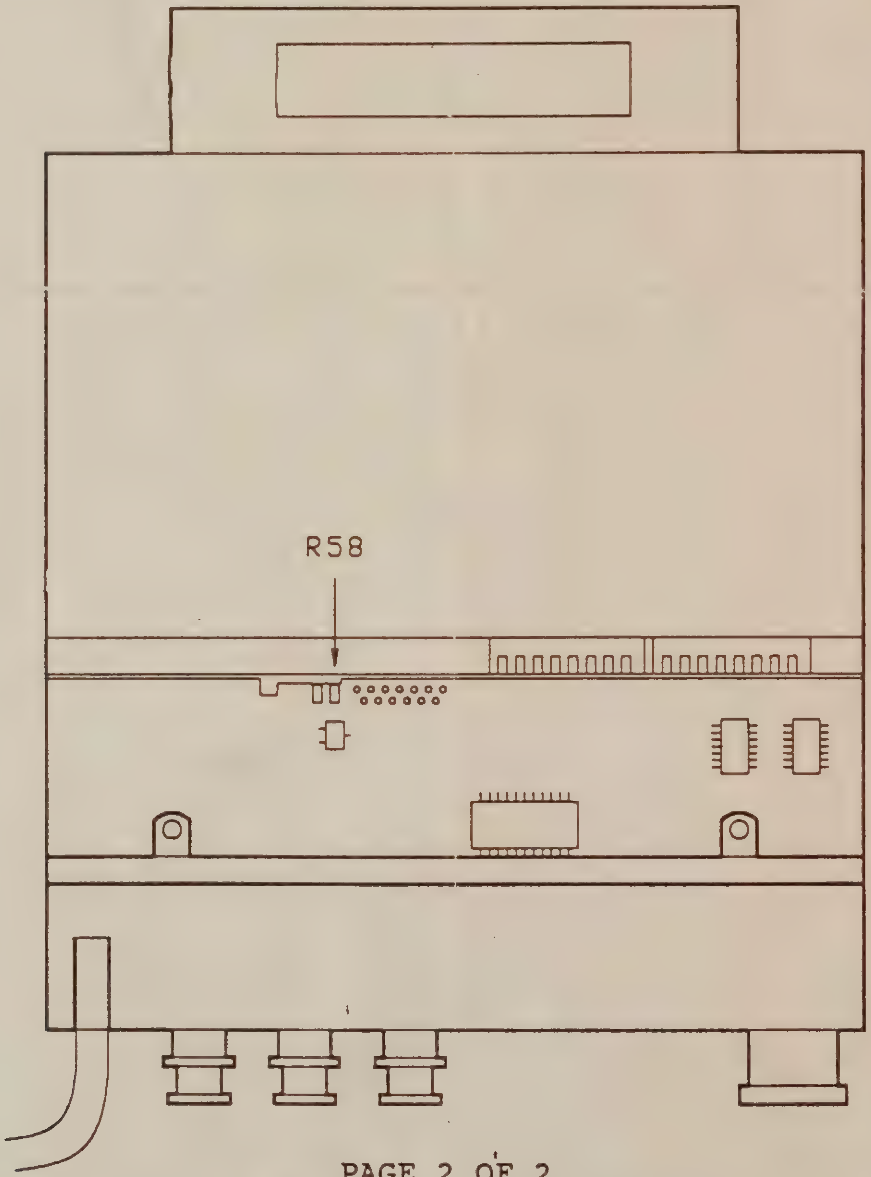

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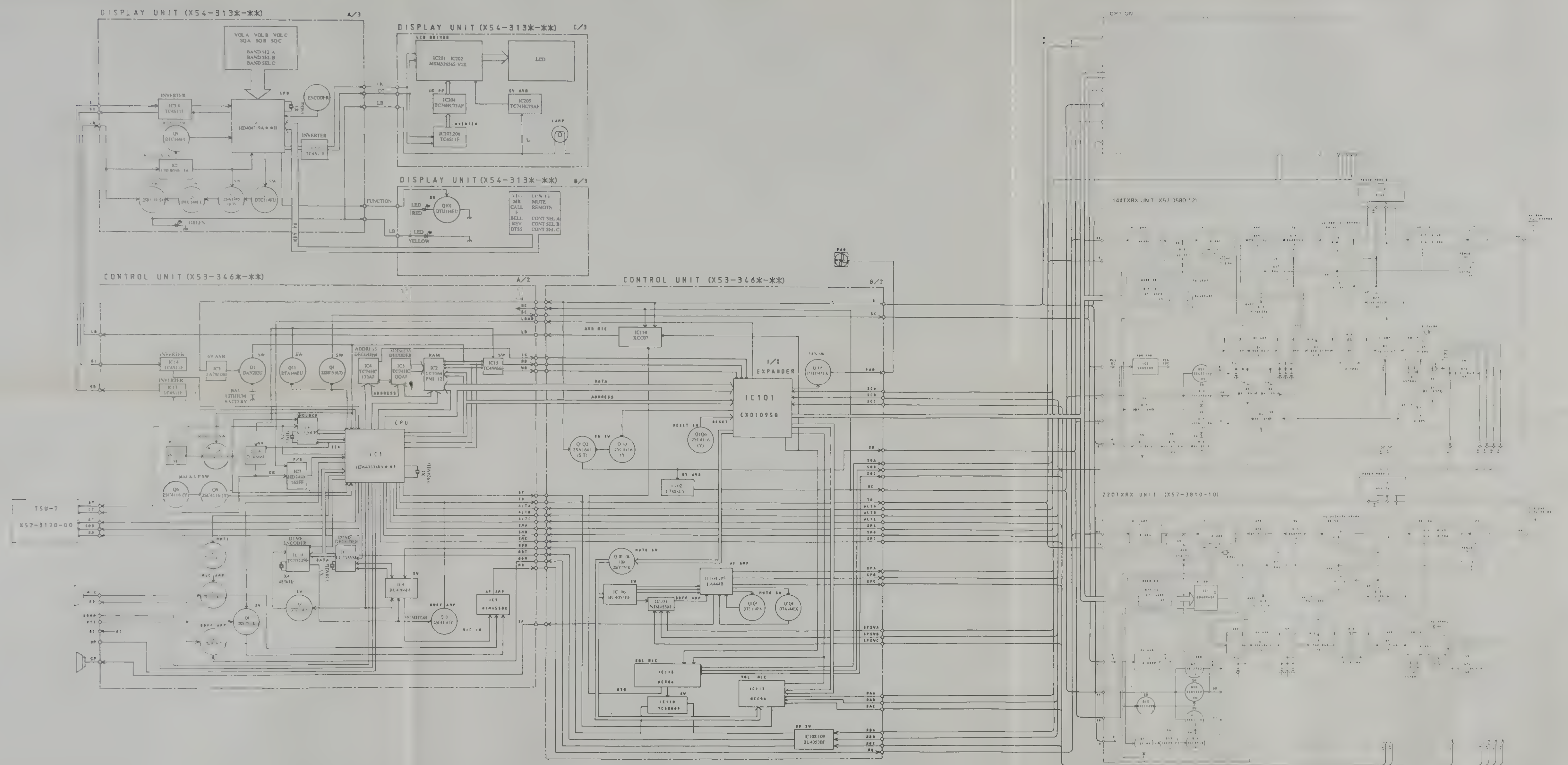
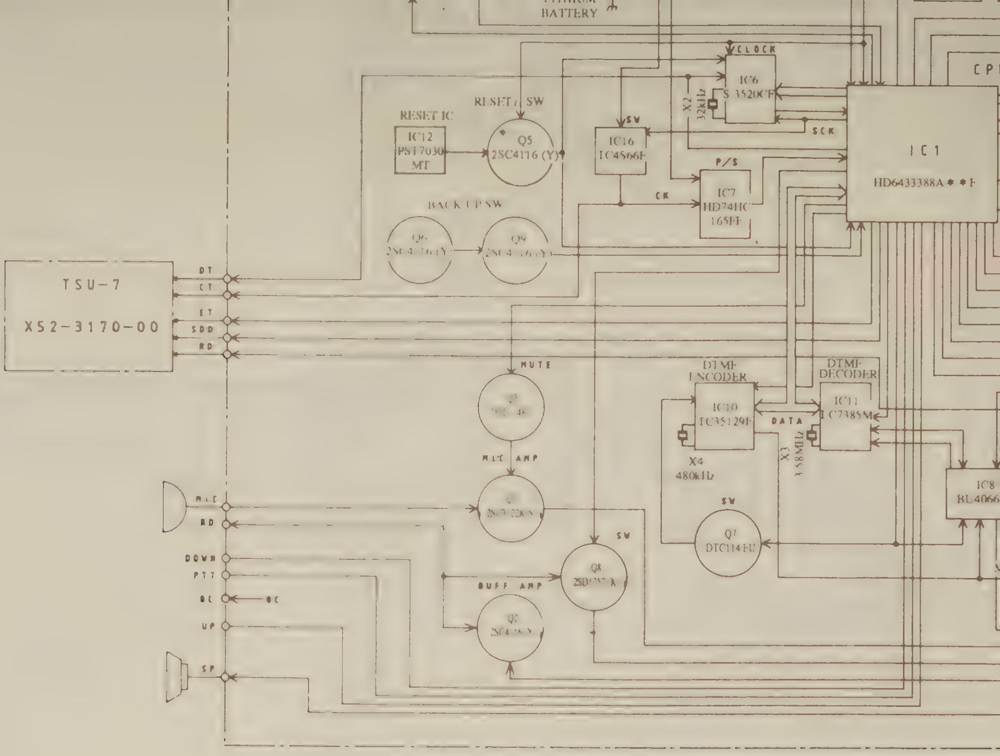
TM-642A BLOCK DIAGRAM

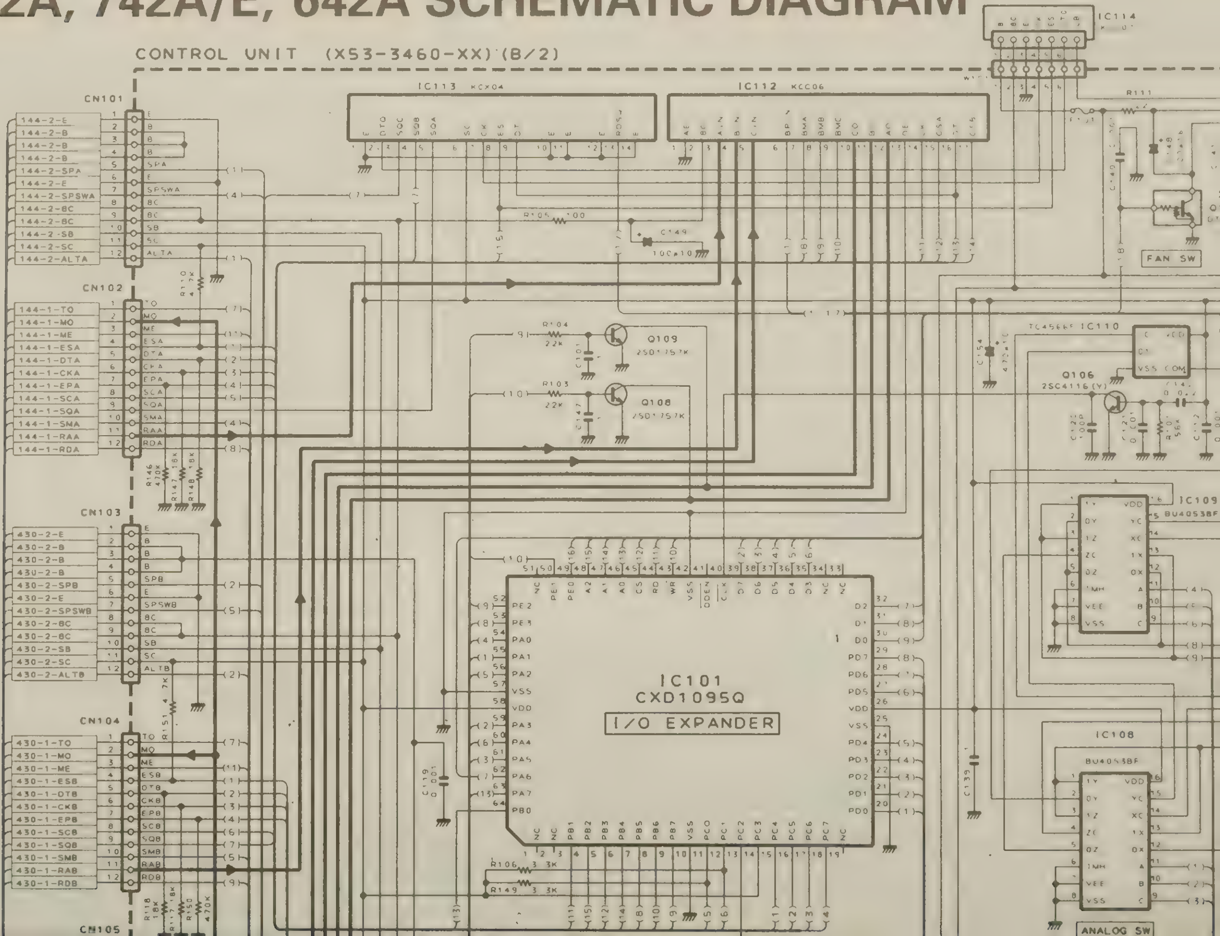

DISPLAY UNIT (X54-313*-**) A/3
DISPLAY UNIT (X54-313*-**) C/3
DISPLAY UNIT (X54-313*-**) B/3
LCD
ENCODER
INVERTER
FUNCTION
LED RED
LED YELLOW
GREEN
CONTROL UNIT (X53-346*-**) A/3
CONTROL UNIT (X53-346*-**) B/3
I/O EXPANDER
IC101 CX010950
CPU
DATA
ADDRESS
TSU-7
X57-3170-00
144TXRX UNIT X57-3580-12
220TXRX UNIT (X57-3810-10)

Note:
Circuits are subject to change without notice due to advancements in technology

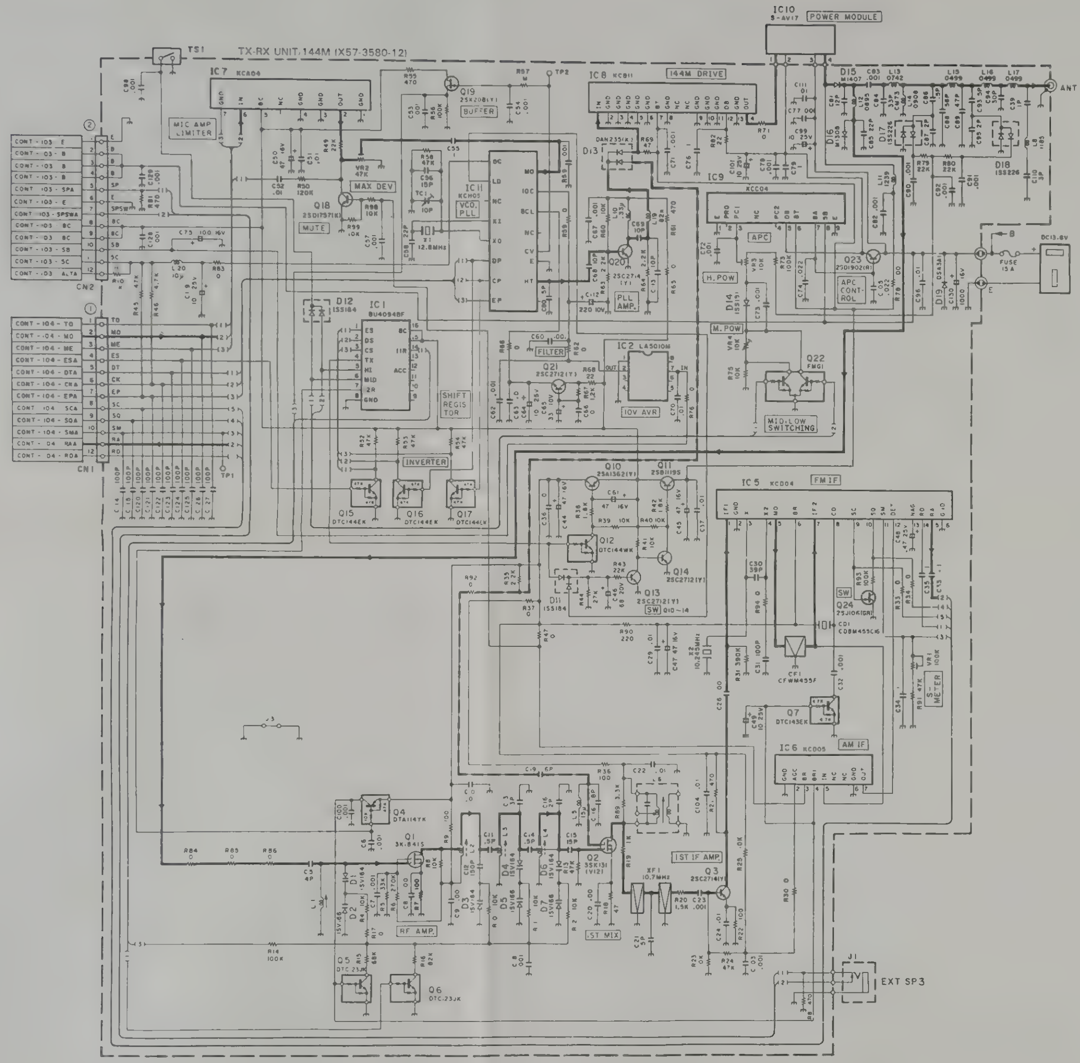


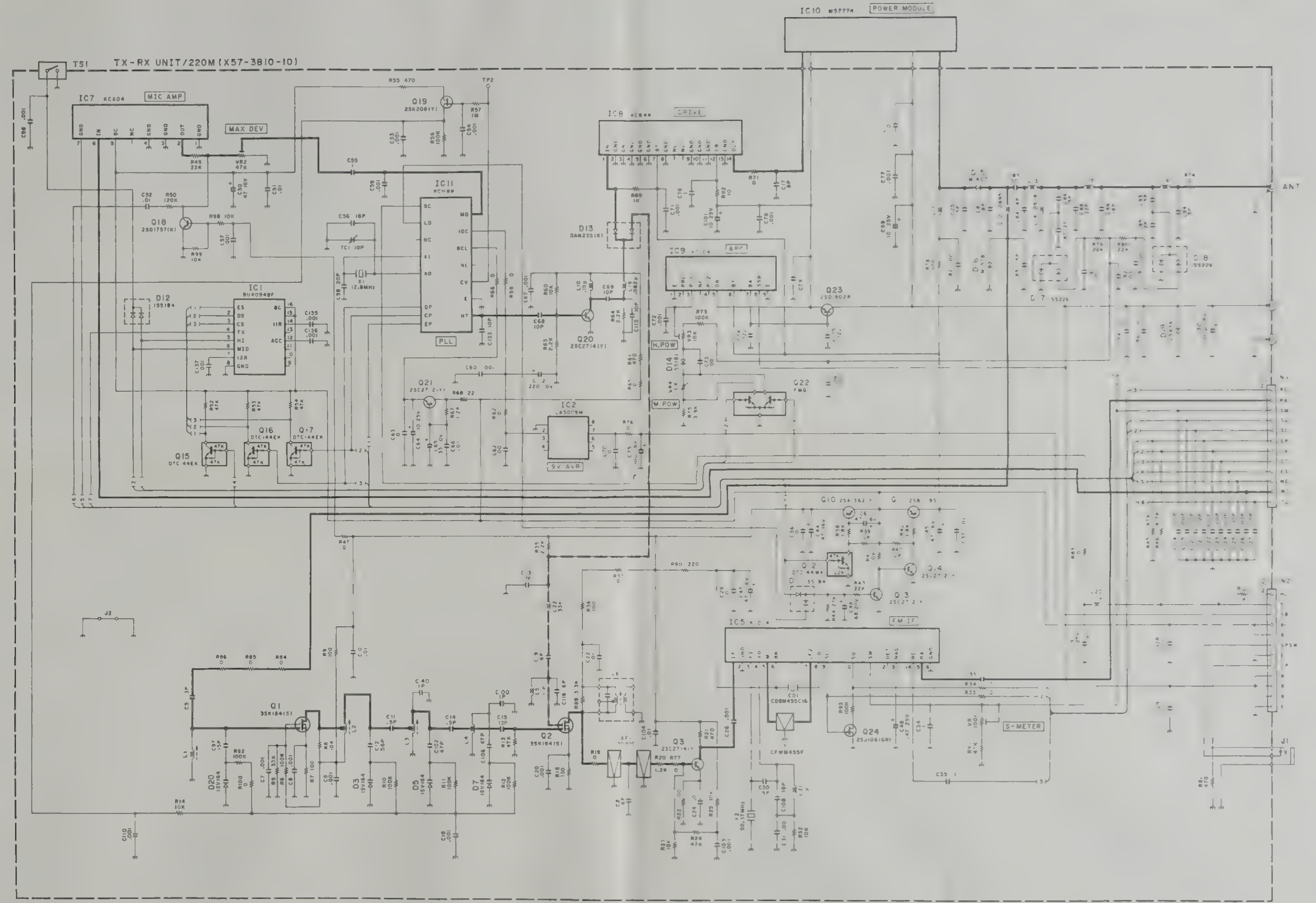
TM-942A, 742A, 642A 3/3

TM-942A, 742A/E, 642A SCHEMATIC DIAGRAM



TM-642A SCHEMATIC DIAGRAM





Note:
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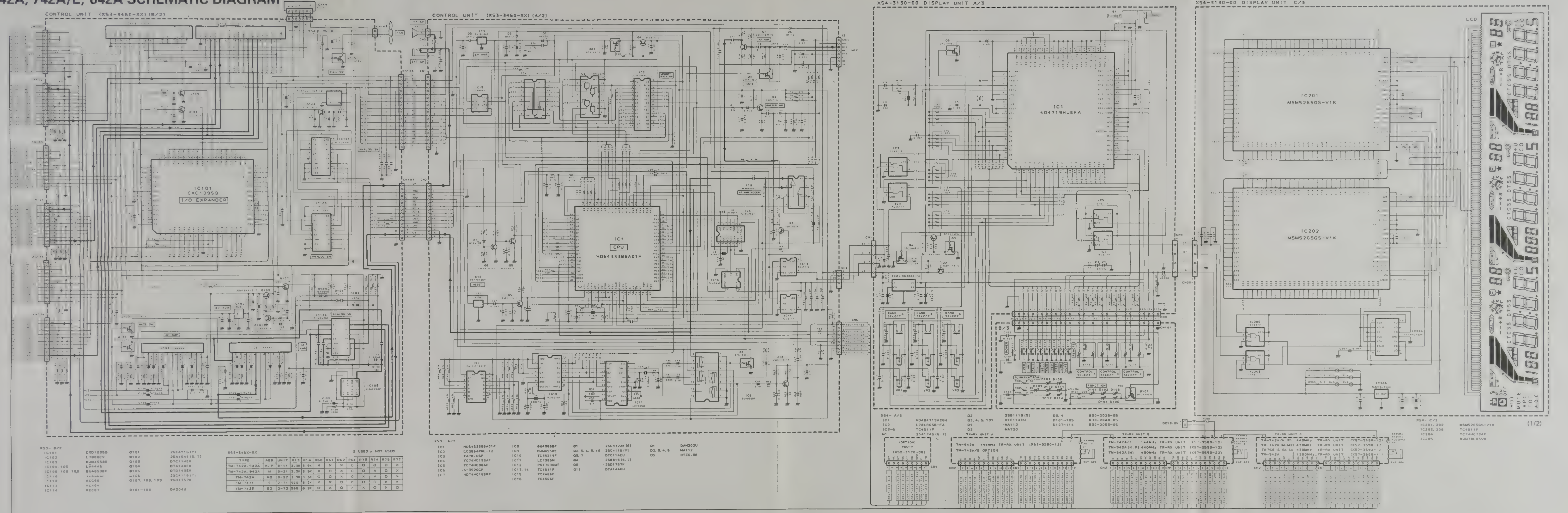
TM-942A, 742A/E, 642A SCHEMATIC DIAGRAM


CONTROL UNIT (X53-3460-XX) (B/2)
CONTROL UNIT (X53-3460-XX) (A/2)
X54-3130-00 DISPLAY UNIT A/3
X54-3130-00 DISPLAY UNIT C/3
IC101 CXD1095Q I/O EXPANDER
IC1 CPU HD6433388A01F
IC1 404719HJEKA
IC201 MSM5265GS-V1K
IC202 MSM5265GS-V1K
LCD
B/3
ILLUMINATION
FUNCTION
CONTROL SELECT
BAND SELECT
MUTE
APO
TOT
ABC
DC13.8V
TX-RX UNIT A
TX-RX UNIT B
(OPTION) TSU-7 (X52-3170-00)
TM-942A 144MHz TR-RX UNIT (X57-3580-12)
TM-742A/E OPTION
TM-742A/E 144MHz TR-RX UNIT
TM-942A (K, P) 440MHz TR-RX UNIT
TM-942A (M) 430MHz TR-RX UNIT
EXT SP2
CN1
CN2
VR1
VR2
VR3

X53- B/2

IC101	CXD1095Q	Q101	2SC4116 (Y)
IC102	L7808CV	Q102	2SA1641 (S, T)
IC103	NJM4558E	Q103	DTC114EK
IC104, 105	LA4446	Q104	DTA144EK
IC106 108 109	BU4053BF	Q105	DTD143EK
IC110	TC4S66F	Q106	2SC4116 (Y)
IC112	KCC06	Q107, 108, 109	2SD1757K
IC113	KCX04		
IC114	KCC07	D101~103	DA204U

X53-346X-XX

○ USED × NOT USED

TYPE	ABB	UNIT	R13	R14	R60	R61	R62	R64	R73	R74	R75	R77
TM-742A, 942A	K, P	0-11	3.3K	3.9K	×	×	×	○	○	○	○	×
TM-742A, 942A	M	0-21	3.3K	3.9K	×	○	×	○	○	×	○	×
TM-742A	M2	0-22	3.9K	3.3K	○	○	×	○	×	×	○	×
TM-742E	E	2-71	560	8.2K	×	×	○	○	○	○	×	×
TM-742E	E2	2-72	560	8.2K	○	×	○	×	×	○	×	○

X53- A/2

IC1	HD6433388A01F	IC8	BU4066BF	Q1	2SC3722K (S)	D1	DAN202U
IC2	LC3564PML-12	IC9	NJM4558E	Q2, 5, 6, 9, 10	2SC4116 (Y)	D2, 3, 4, 6	MA112
IC3	TA78L06F	IC10	TC35219F	Q3, 7	DTC114EU	D5	DTZ6.8B
IC4	TC74HC138AF	IC11	LC7385M	Q4	2SB815 (6, 7)		
IC5	TC74HC00AF	IC12	PST7030MT	Q8	2SD1757K		
IC6	S-3520CF	IC13, 14	TC4S11F	Q11	DTA144EU		
IC7	HD74HC165PF	IC15	TC4W66F				
		IC16	TC4S66F				

X54- A/3

IC1	HD404719A26H	Q2	2SB1119 (5)	D3, 4	B30-2025-05
IC2	L78LR05B-FA	Q3, 4, 5, 101	DTC114EU	D101~105	B30-2048-05
IC3~6	TC4S11F	D1	MA112	D107~114	B30-2053-05
Q1	2SA1745 (6, 7)	D2	MA720		

X54- C/3

IC201, 202	MSM5265GS-V1K
IC203, 206	TC4S11F
IC204	TC74HC73AF
IC205	NJM78L05UA

(1/2)

Note:
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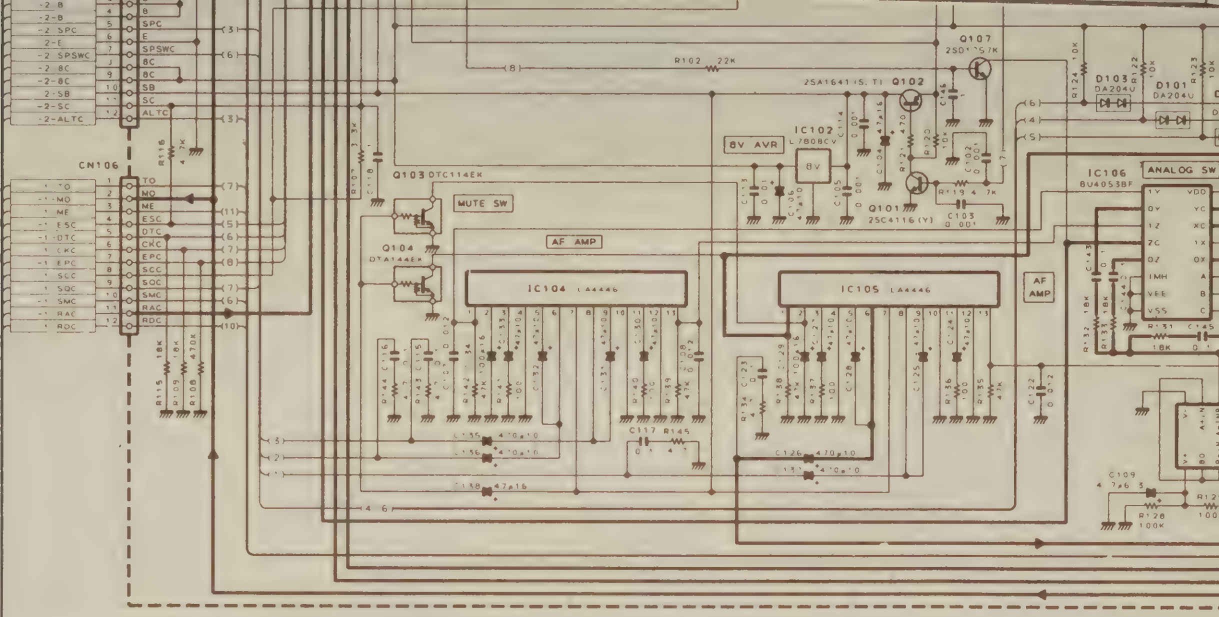


X53- B/2

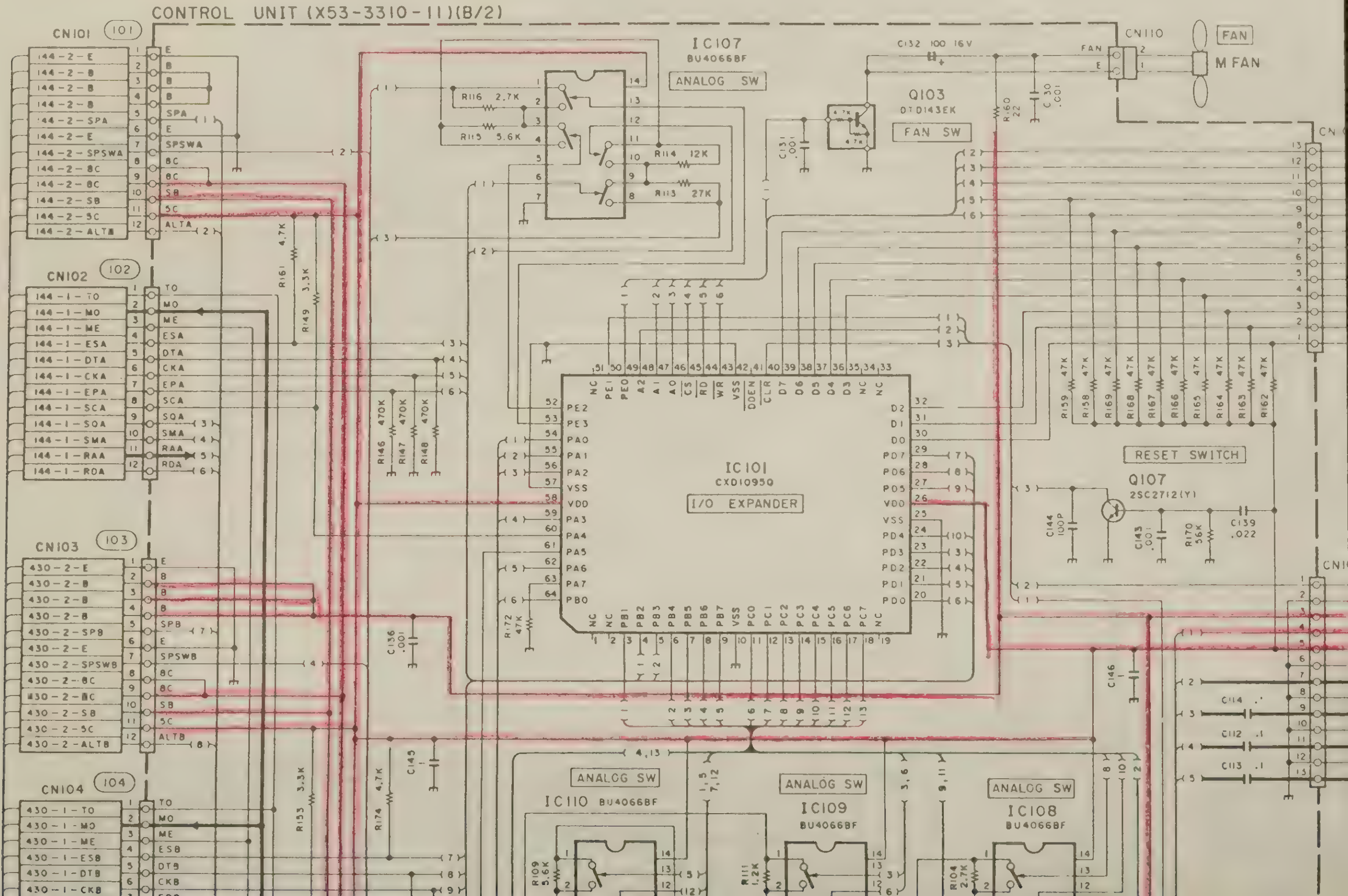
IC101	CXD1095Q	Q101	2SC4116(Y)
IC102	L7808CV	Q102	2SA1641(S T)
IC103	NJM4558E	Q103	DTC114EK
IC104, 105	LA4446	Q104	DTA144EK
IC106, 10[illegible], [illegible]09	BU4053BF	Q105	DTD143EK
IC110	TC4S66F	Q106	2SC4116(Y)
IC112	KCC06	Q107, 108, [illegible]0[illegible]	2SD1757K
IC113	KCX04		
IC114	KCC07	D101~103	DA204U

X53-346X-XX

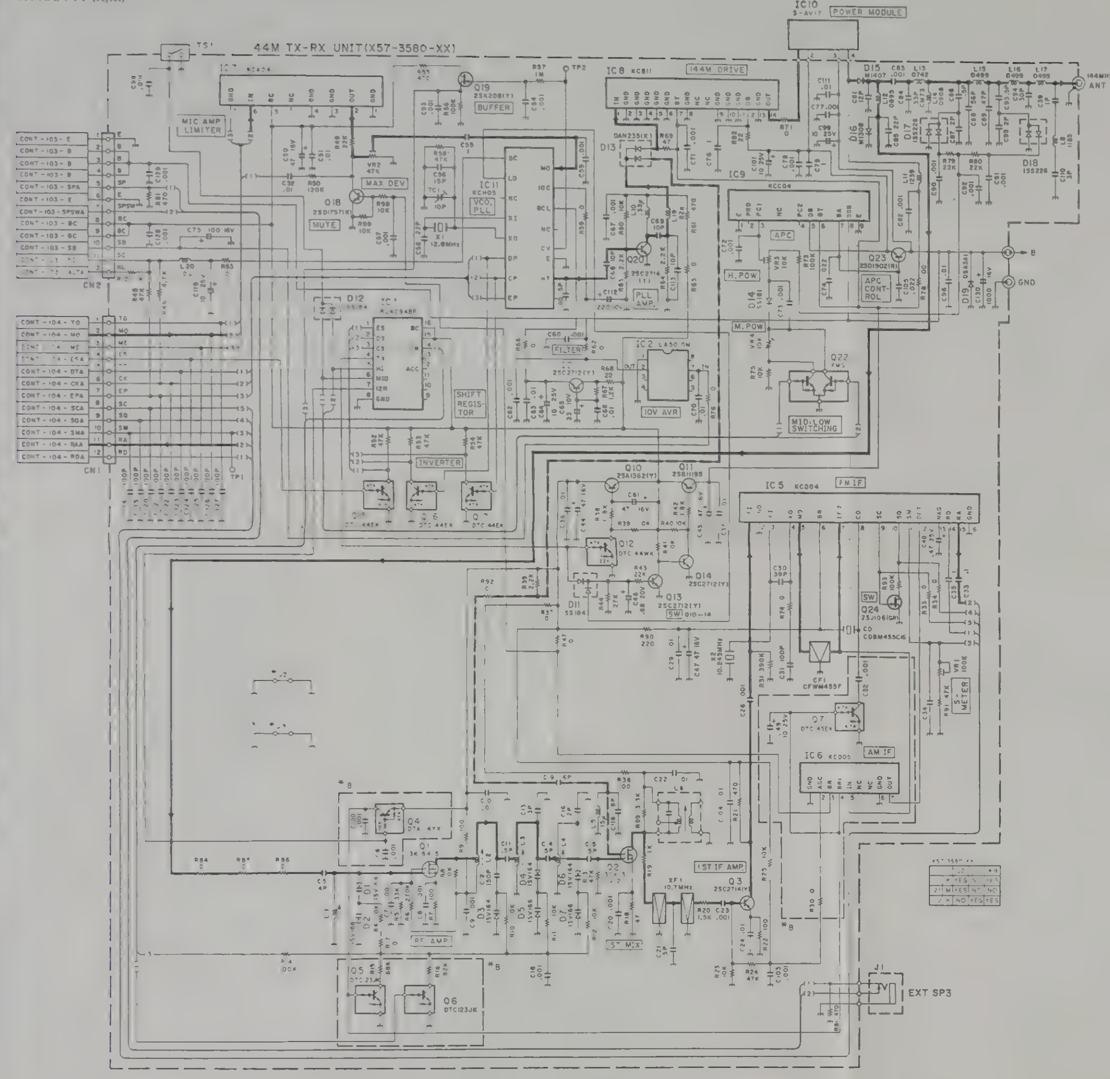
TYPE	ABB	UNIT	R13	R14	R60	R61	R62	R6
TM-742A, 942A	K, P	0-11	3.3K	3.9K	×	×	×	○
TM-742A, 942A	M	0-21	3.3K	3.9K	×	○	×	○
TM-742A	M2	0-22	3.9K	3.3K	○	○	×	○
T[illegible]-7[illegible]2E	E	2-71	560	8.2[illegible]	×	×	○	○
TM-742E	E2	2-72	560	8.2K	○	×	○	×

TM-942A, 742A/E, 642A 2/3

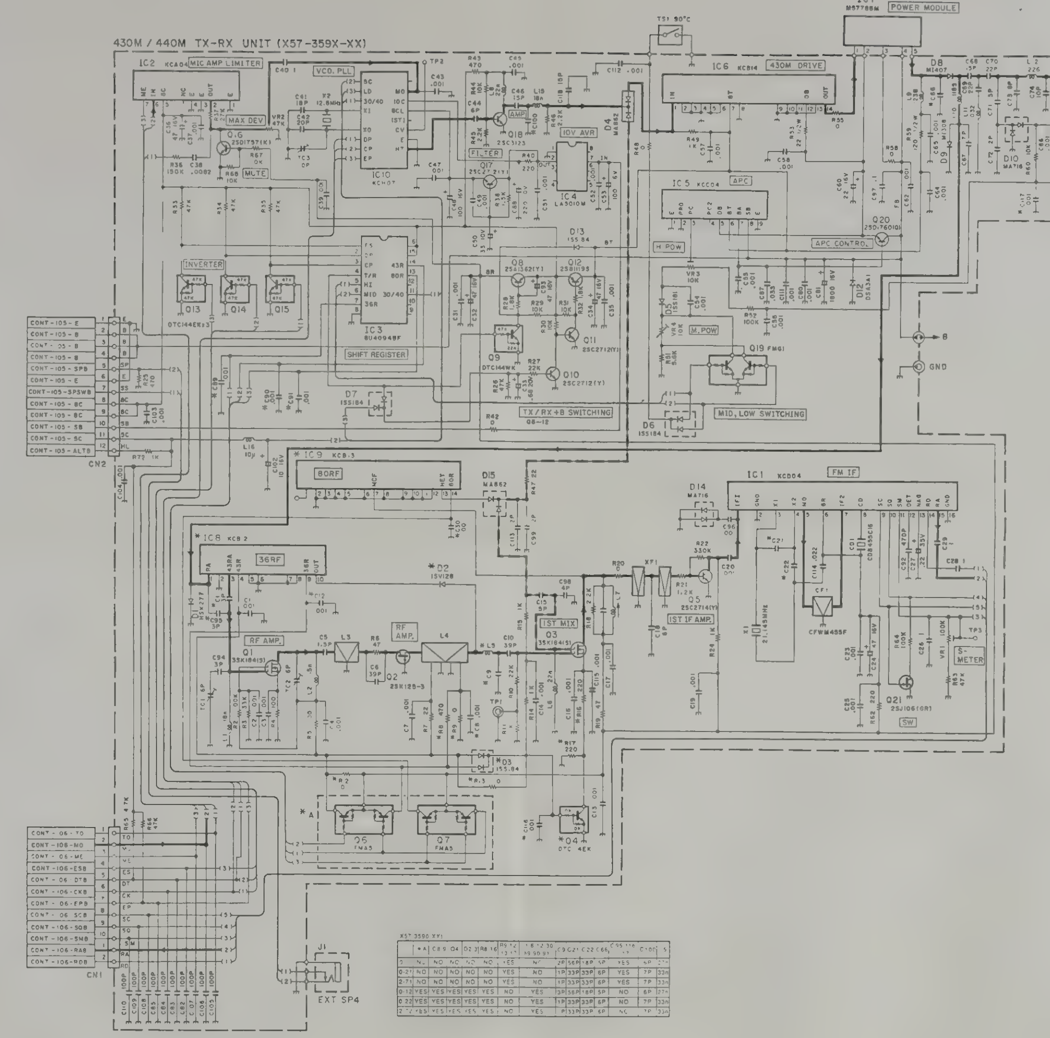
5-2. TM-941A SCHEMATIC DIAGRAM



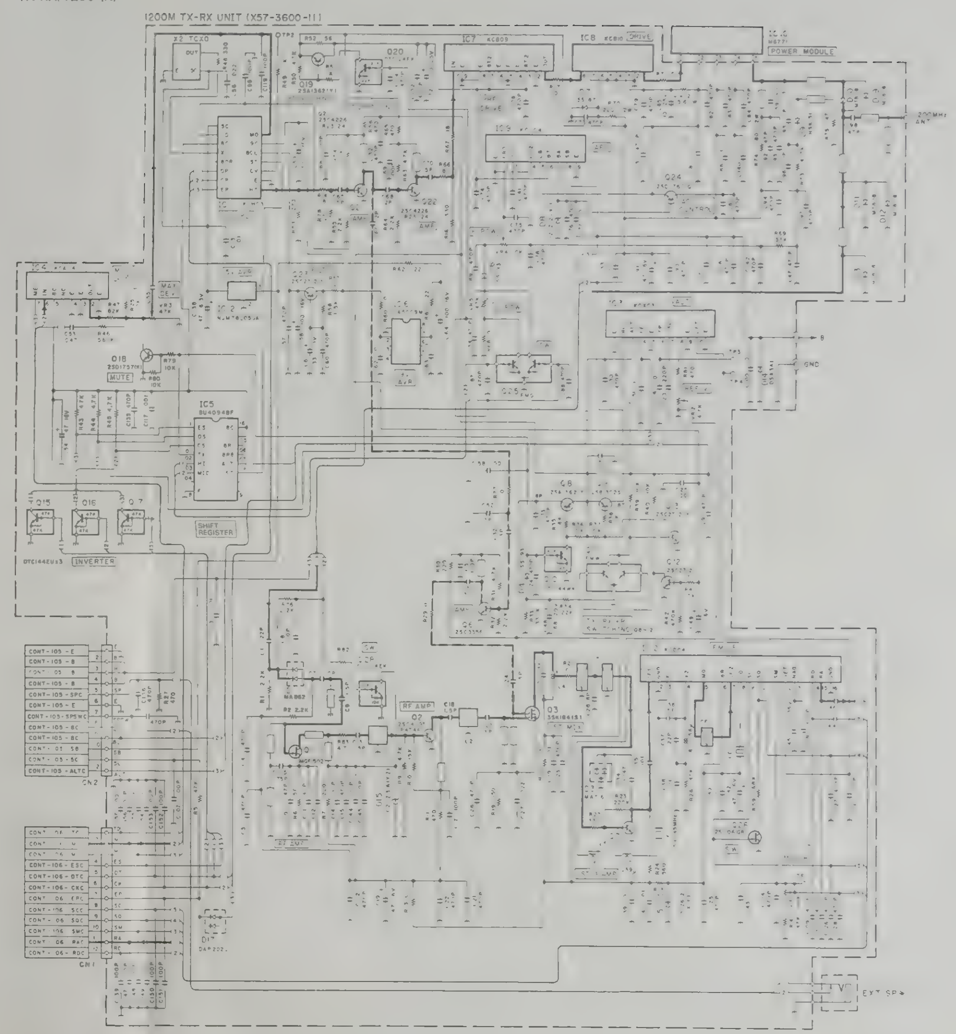
TX-RX/144 (K,M)



TX-RX/430/440 (K)



TX-RX/1200 (K)



Note:
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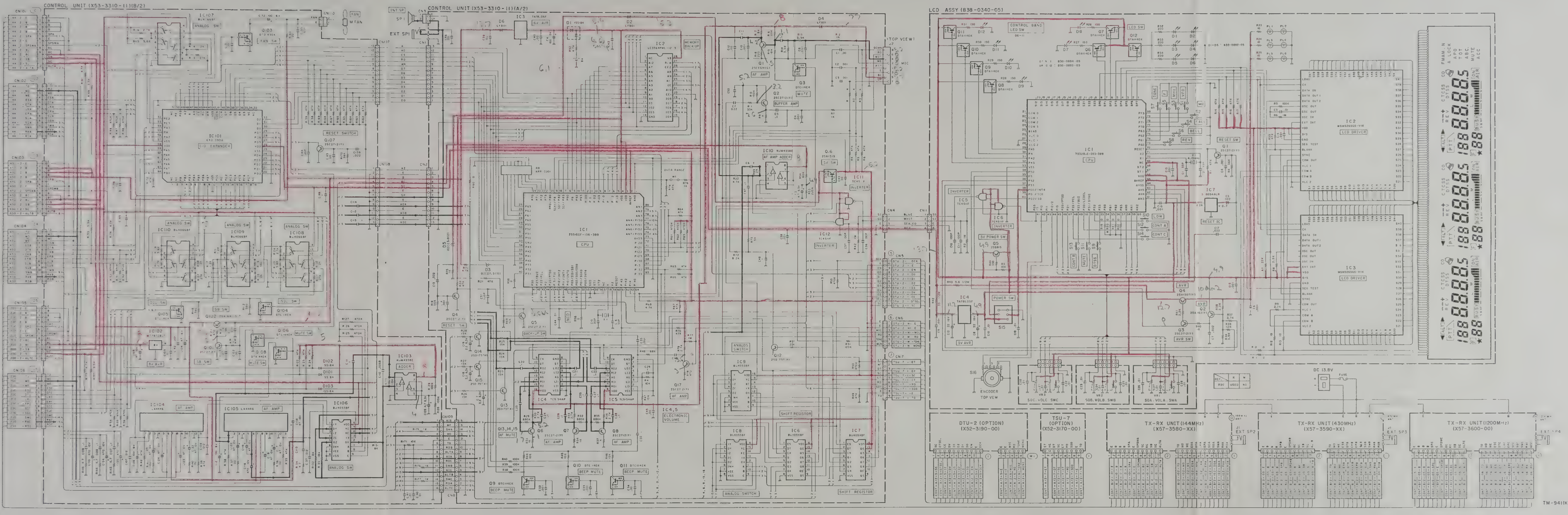
5-2. TM-941A SCHEMATIC DIAGRAM



Note:
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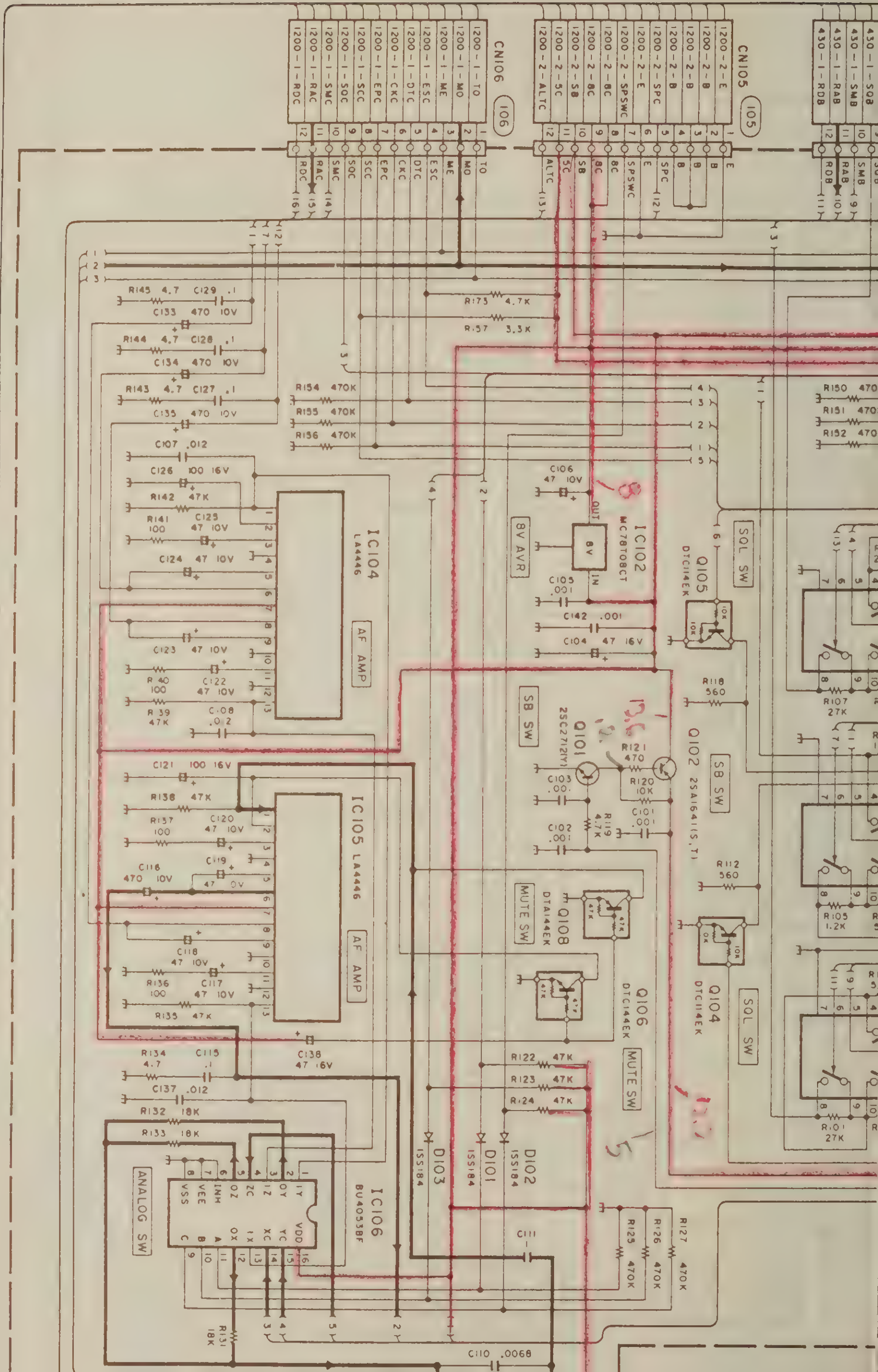
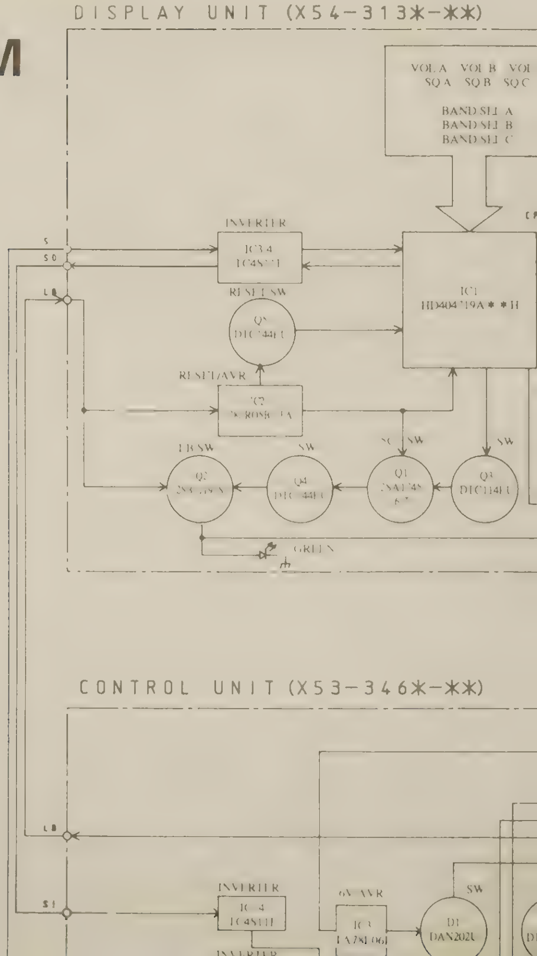
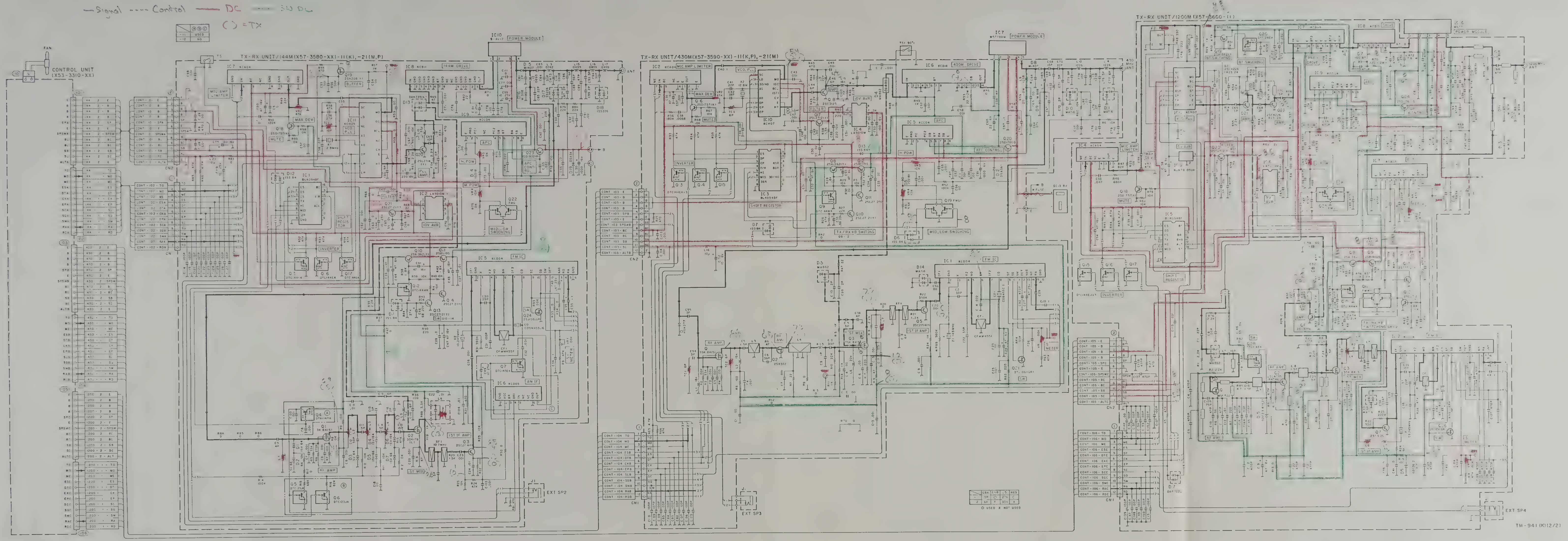

CN106
106
1200-1-TO
1200-1-MO
1200-1-ME
1200-1-ESC
1200-1-DTC
1200-1-CKC
1200-1-EPC
1200-1-SCC
1200-1-SOC
1200-1-SMC
1200-1-RAC
1200-1-RDC
TO
MO
ME
ESC
DTC
CKC
EPC
SCC
SOC
SMC
RAC
RDC
CN105
105
1200-2-E
1200-2-B
1200-2-B
1200-2-B
1200-2-SPC
1200-2-E
1200-2-SPSWC
1200-2-BC
1200-2-BC
1200-2-SB
1200-2-5C
1200-2-ALTC
E
B
B
B
SPC
E
SPSWC
BC
BC
SB
5C
ALTC
430-1-SOB
430-1-SMB
430-1-RAB
430-1-RDB
SOB
SMB
RAB
RDB
R145 4.7
C129 .1
C133 470 10V
R144 4.7
C128 .1
C134 470 10V
R143 4.7
C127 .1
C135 470 10V
C107 .012
C126 100 16V
R142 47K
R141 100
C125 47 10V
C124 47 10V
C123 47 10V
R140 100
C122 47 10V
R139 47K
C108 .012
R173 4.7K
R157 3.3K
R154 470K
R155 470K
R156 470K
IC104
LA4446
AF AMP
C106 47 10V
8
OUT
8V
IN
IC102
MC78T08CT
8V AVR
C105 .001
C142 .001
C104 47 16V
Q105
DTC114EK
10K
10K
SOL SW
R118 560
R107 27K
SB SW
Q101
2SC2712(Y)
13.6
R121 470
Q102 2SA1641(S,T)
SB SW
C103 .001
R120 10K
R119 4.7K
C101 .001
C102 .001
R112 560
R105 1.2K
R150 470
R151 470
R152 470
C121 100 16V
R138 47K
R137 100
C120 47 10V
C119 47 10V
C116 470 10V
IC105 LA4446
AF AMP
C118 47 10V
R136 100
C117 47 10V
R135 47K
MUTE SW
Q108
DTA144EK
47K
47K
Q106
DTC144EK
MUTE SW
Q104
DTC114EK
SOL SW
C138 47 16V
R134 4.7
C115 .1
C137 .012
R132 18K
R133 18K
R122 47K
R123 47K
R124 47K
5
D103 1SS184
D101 1SS184
D102 1SS184
ANALOG SW
IC106
BU4053BF
1Y
0Y
1Z
ZC
0Z
INH
VEE
VSS
VDD
YC
XC
1X
0X
A
B
C
C111
R125 470K
R126 470K
R127 470K
R131 18K
C110 .0068
R101 27K

BLOCK DIAGRAM and SCHEMATIC DIAGRAM

TM-942A, 742A/E BLOCK DIAGRAM

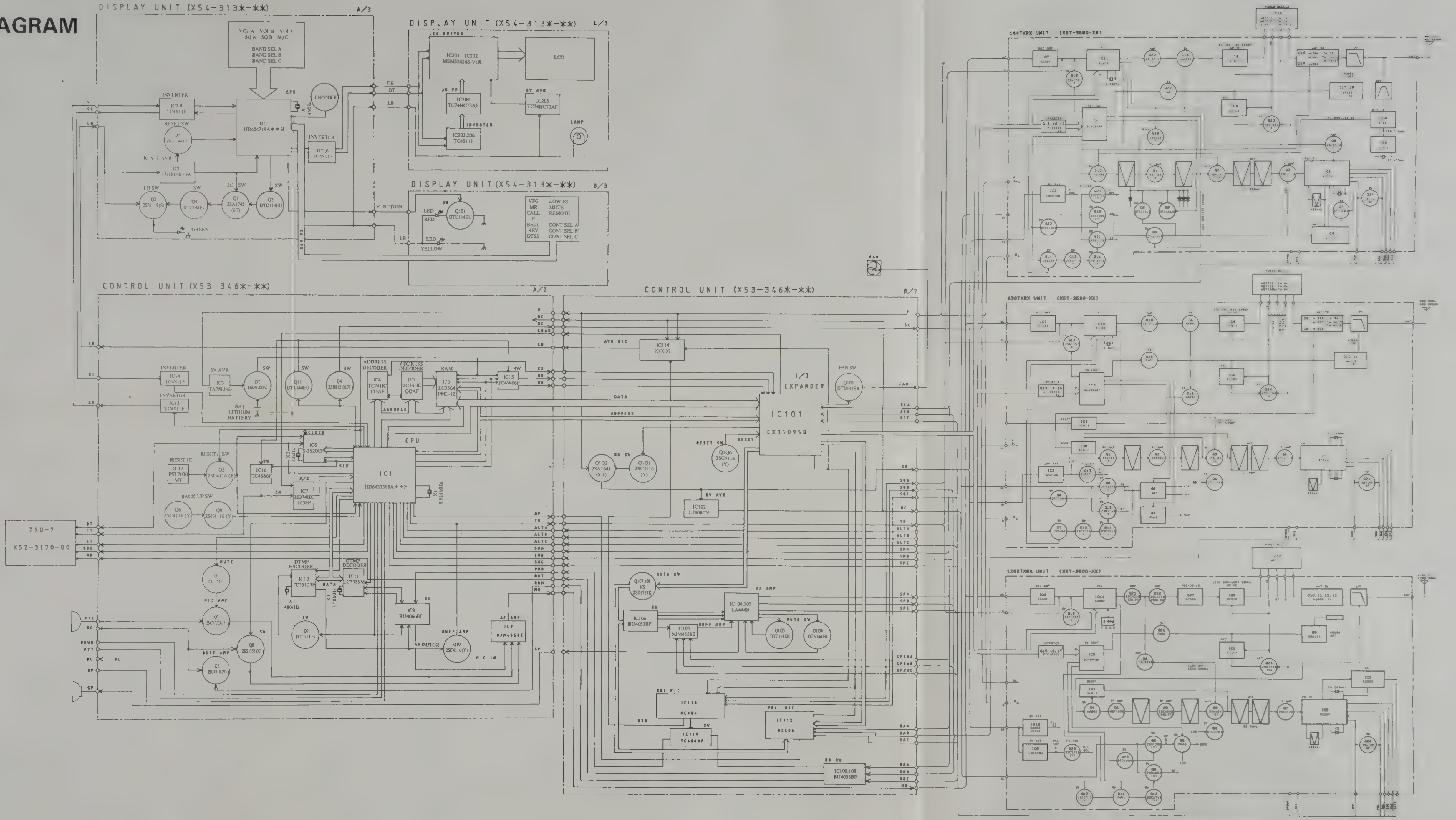



—Signal ---- Control —— DC —— 5V DC
( ) = TX
ⒶⒷⒸ
-11 USED
-12 NO
FAN
CONTROL UNIT (X53-3310-XX)
TX-RX UNIT/144M(X57-3580-XX)-11(K), -21(M,P)
IC10
POWER MODULE
144M DRIVE
BUFFER
MIC AMP LIMITER
ANT
TX-RX UNIT/430M(X57-3590-XX)-11(K,P), -21(M)
MIC AMP LIMITER
VCO, PLL
MAX DEV
AMP
TS1 90°C
IC7
POWER MODULE
430M DRIVE
TX-RX UNIT/1200M(X57-3600-11)
BT SWITCHING
PRE-DRIVE
POWER MODULE
DRIVE
EXT SP2
EXT SP3
EXT SP4

TM-941 (K)(2/2)

BLOCK DIAGRAM and SCHEMATIC DIAGRAM

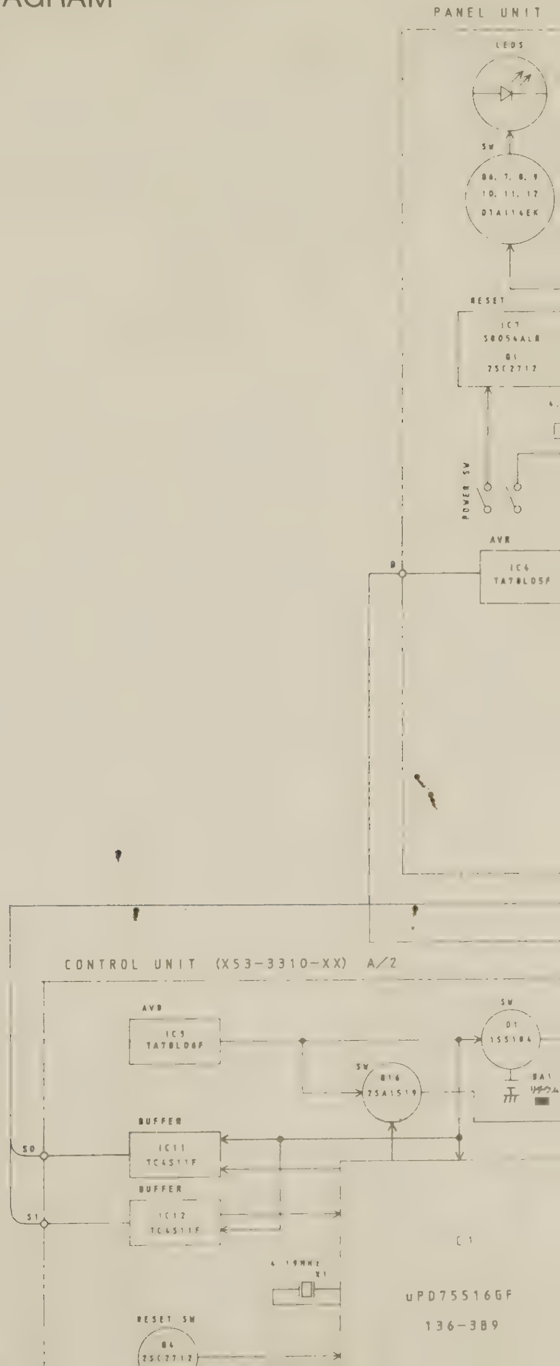
TM-942A, 742A/E BLOCK DIAGRAM



Note:
Circuits are subject to change without notice due to advancements in technology.

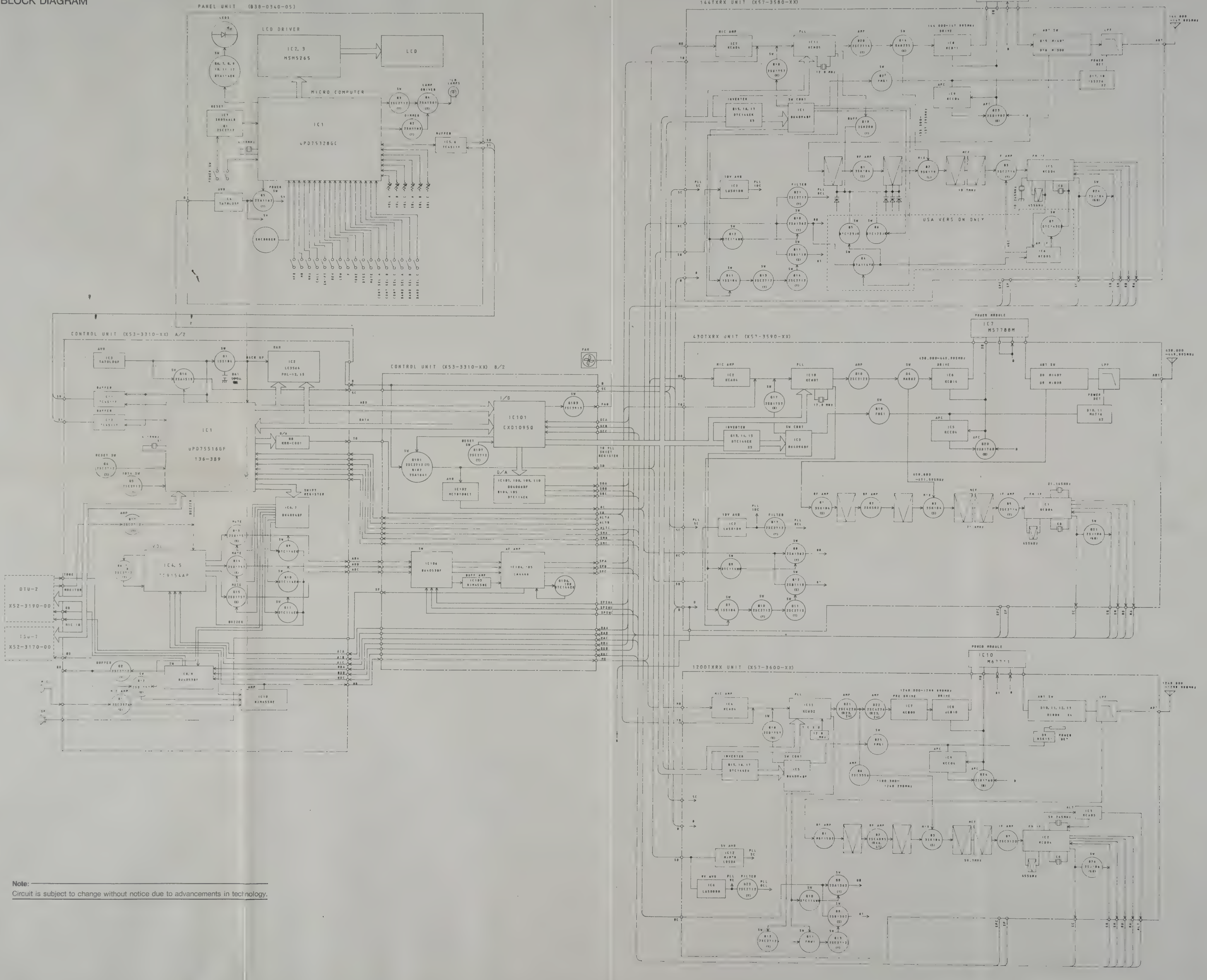
5. BLOCK DIAGRAM and SCHEMATIC DIAGRAM

5-1. TM-941A BLOCK DIAGRAM



5. BLOCK DIAGRAM and SCHEMATIC DIAGRAM

5-1. TM-941A BLOCK DIAGRAM



Note:

Circuit is subject to change without notice due to advancements in technology.

140/430/1200MHz FM TRIBANDER

TM-941A

SERVICE MANUAL

KENWOOD

WB6DTR

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B51-8079-00(A) 582

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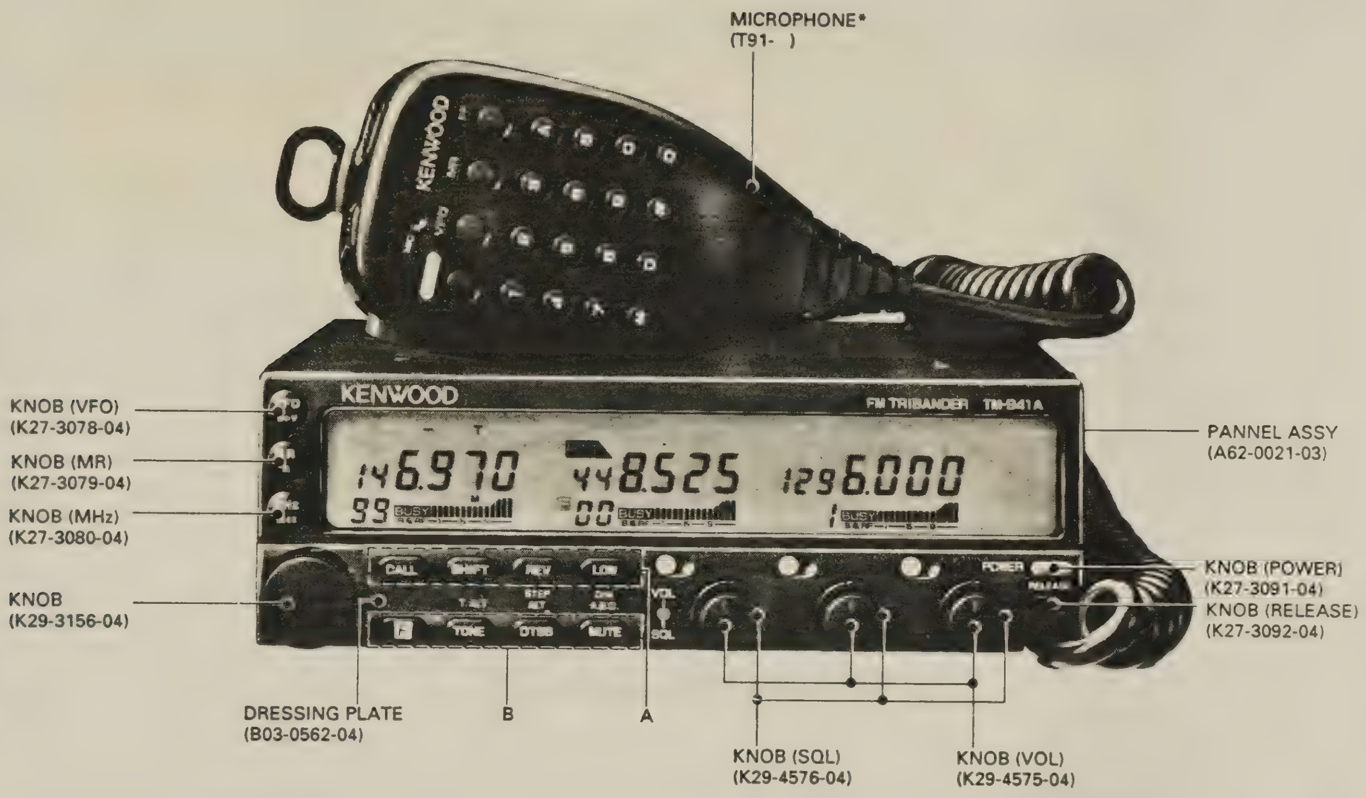

A	KNOB (CALL) K27-3081-04	KNOB (SHIFT) K27-3089-04	KNOB(REV) K27-3085-04	KNOB(LOW) K27-3087-04
B	KNOB (F) K27-3082-04	KNOB (TONE) K27-3084-04	KNOB (DTSS) K27-3086-04	KNOB (MUTE) K27-3088-04

***Refer to parts list on page 41.**

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CIRCUIT DESCRIPTION

144 TX-RX Unit Frequency Configuration

The 144 MHz unit incorporates a digital variable-frequency oscillator (VFO) that can freely select a channel step of 5, 10, 12.5, 15, 20, or 25 kHz with a Phase-Locked-Loop (PLL) synthesizer system.

The frequency in the receive signal channel is mixed with a first local oscillation frequency of 133.300-137.295 MHz to produce a first intermediate frequency of 10.7 MHz. This frequency is then mixed with a second local oscillation frequency of 10.245 MHz to produce a second intermediate frequency of 455 kHz. This is called a double-conversion system.

The signal in the transmission channel is directly oscillated and frequency-divided by a PLL circuit, amplified by a straight amplifier, then transmitted.

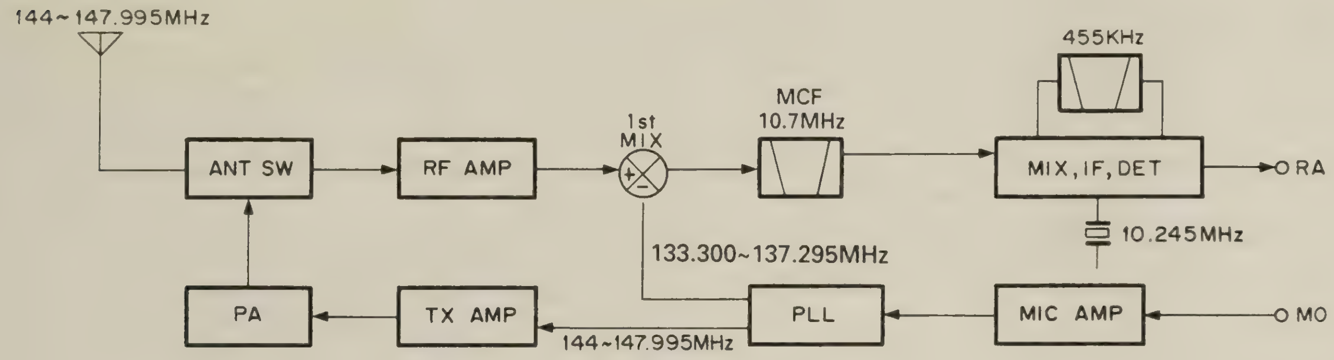


Fig. 1 Frequency configuration

144 TX-RX Unit Receive Signal Channel

- **Outline**

For the 144 MHz unit,the received signal from an antenna is passed through a low-pass filter in the final transmission stage and sent through a transmission/reception selection diode switch to the receiving front end. The signal is then passed through an antenna matching coil and amplified to high frequencies by a GaAs (gallium arsenide) field-effect transistor. The unwanted components of the signal are eliminated by a bandpass filter consisting of a three-stage variable capacitor. The resultant signal is sent to the first mixer, mixed with the first local signal from a PLL circuit, then converted to a first intermediate frequency of 10.7 MHz. The unwanted near-by signal components are then eliminated by a two-stage MCF.

Item	Rating
Nominal center frequency (fo)	10.7MHz
Pass band width	±7.5kHz or less at 3dB
Attenuation band width	±25kHz or less at 40dB ±45kHz or less at 60dB
Ripple	1.0dB or less
Insertion loss	1.5dB or less
Guaranteed attenuation	70dB or more within ±1MHz (Spurious : 40dB or more at fo – fo + 500kHz) 80dB or more at fo – (900 – 920kHz)
Terminating impedance	3kΩ/0pF

Table 1 MCF (L71-0228-05) (144 TX-RX unit XF1)

Item	Rating
Nominal center frequency	455kHz ± 1kHz
6dB bandwidth	±6kHz or more (from 455kHz)
50dB bandwidth	±12.5kHz or less (from 455kHz)
Ripple (within ±4kHz of 455kHz)	3dB or less
Insertion loss	6dB or less
Guaranteed attenuation (within ±100kHz of 455kHz)	35dB or more
I/O matching impedance	2.0kΩ

Table 2 Ceramic filter CFWM455F (L72-0372-05) (144 TX-RX unit CF1)

CIRCUIT DESCRIPTION

The first intermediate-frequency signal is amplified and input to FM IF HIC IC5 (KCD04). This signal is then mixed with a second local oscillation frequency of 10.245MHz to produce a second intermediate-frequency signal of 455 kHz. The unwanted near-by signal components are then eliminated by an FM ceramic filter. The resultant signal is input to IC5 again, amplified to a second intermediate-frequency signal, and detected to produce an audio signal.

- **Signal-strength meter**

The signal-strength meter output voltage of FM IF HIC IC5 (KCD04) is supplied to the control unit.

- **Shift-register circuit**

The ES, CK, and DT serial data from the control unit are sent to IC1 (BU4094BF) to perform the control operation outlined in the following table:

Pin NO.	Name	Function	Pin No.	Name	Function
1	Strobe	Enable input	9	Q_S	
2	Data	Serial data input	10	Q'_S	
3	Clock	Clock input	11	Q8	TX/RX selection. "H" when TX is set.
4	Q1	TX/RX selection. "L" when TX is set	12	Q7	439/144 MHz selection. "H" when 144MHz is set.
5	Q2	TX power selection. "L" when middle and low. "H" when high.	13	Q6	
6	Q3	TX power selection. "L" when high and low. "H" when middle.	14	Q5	
7	Q4		15	OE	8V
8	V_{ss}	GND	16	V_{DD}	8V

Table 3

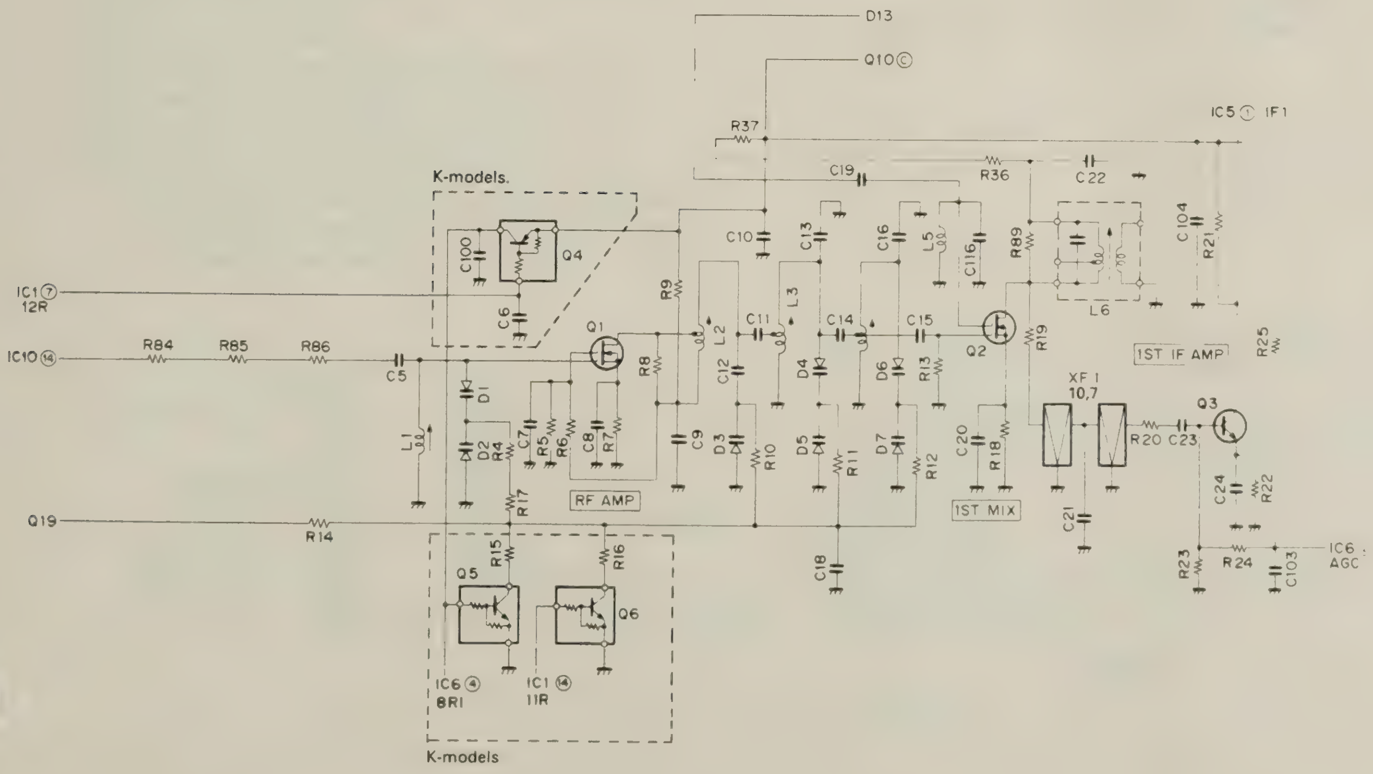


Fig. 2

CIRCUIT DESCRIPTION

144 TX-RX Unit Transmit Signal Channel

- **Outline**

In the transmission channel, the desired frequency is directly oscillated and directly frequency modulated by means of a varicap diode.

- **Modulator circuit**

The audio signal from the control unit is input to microphone amplifier HIC IC7 (KCA04). IC4 consists of a preemphasis circuit, amplifier, limiter, and splatter circuit that eliminate unwanted high-frequency components. The voltage-controlled oscillator (VCO) signal is directly frequency modulated by means of a varicap diode in the frequency modulator circuit.

- **Younger-stage circuit**

The signal output from the VCO is input to drive circuit HIC IC8 (KCB11). The amplifier can obtain a stable drive output without adjustment because it has a wide band. An APC circuit controls the collector voltage in the younger final stage.

- **Power amplifier circuit**

A drive signal is input to power module IC10 and amplified to the specified level.

- **APC circuit**

The automatic transmission output control circuit (APC) detects and partially amplifies the power module output with a diode and controls the output control voltage. The control voltage is output in inverse proportion to the output, so the control voltage output is always constant. To protect the set against excessive temperature rise, the high-power unit has a thermal switch. The high-power unit is automatically set to a low power by the thermal switch when it exceeds the specified temperature.

144 TX-RX Unit PLL Synthesizer

The VCO and PLL circuit are housed in a solid shielding case as a hybrid integrated circuit. Comparison frequencies of 6.25 kHz and 5 kHz are produced by dividing a 12.8 MHz reference oscillation frequency by 2048 and 2560 to correspond to 5, 10, 12.5, 15, 20, and 25 kHz channel steps.

For 144 MHz, the relationship between fVCO (Rx) and each frequency division ratio is given by
f_{vco}=(144 - 10.7)= {(n x 128) + A} x f_{osc} ÷ R
Where: f_{vco}= VCO output frequency
n : Binary 10-bit programmable counter setting value
A : Binary 7-bit programmable counter setting value
f_{osc}: Reference oscillation frequency of 12.8 MHz

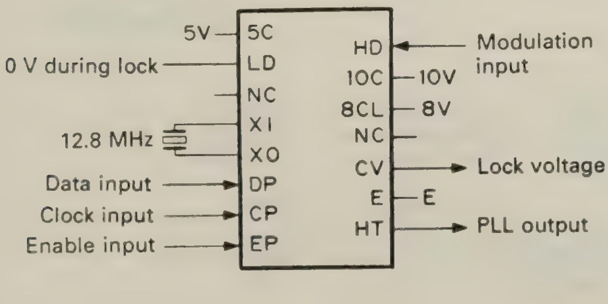


Fig. 3 IC11 KCHO5

R: Binary 14-bit programmable counter setting value 2048
In this case, n is 208, and A is 36.
Therefore, f_{vco}= {(208 x 128) + 36} x 12800 / 2560
= {26624 + 37} x 5
= 133300 kHz = 133.300 MHz

The following table lists the pin functions of the PLL circuit:

Pin name	Function	Pin name	Function
5C	5V	MO	Modulation signal input
LD	Lock signal (on during lock)	10C	10V
NC	Unused	8CL	8V (ripple filter)
XI	12.8 MHz crystal oscillation	NC	Unused
XO		CV	Lock voltage output
DP	Data input	E	GND
CP	Clock input	HT	VCO output
EP	Enable input		

Table 4

CIRCUIT DESCRIPTION

- **8T (8 V during transmission) and unlock signal**

A 0.7 V voltage is applied to the base of Q13 during reception, Q13 is set on, Q14 is set off, and Q11 is set off. No voltage appears at the collector (8T) of Q11. Serial data is output from the control unit during transmission and input to shift register IC1. Pin 4 of IC1 is then set low. Therefore, Q13 is changed from on to off, Q14 from off to on, and Q11 from off to on. An 8 V voltage is applied to the collector (8T) of Q11.

An unlock circuit is activated only during transmission. The LD signal output from the PLL circuit is ORed with the signal at pin 4 of IC1 using D11 as shown in the figure, so the LD signal is set high during unlock. Therefore, no voltage appears at the collector (8T) of Q11 and no transmission wave is output to the reception state.

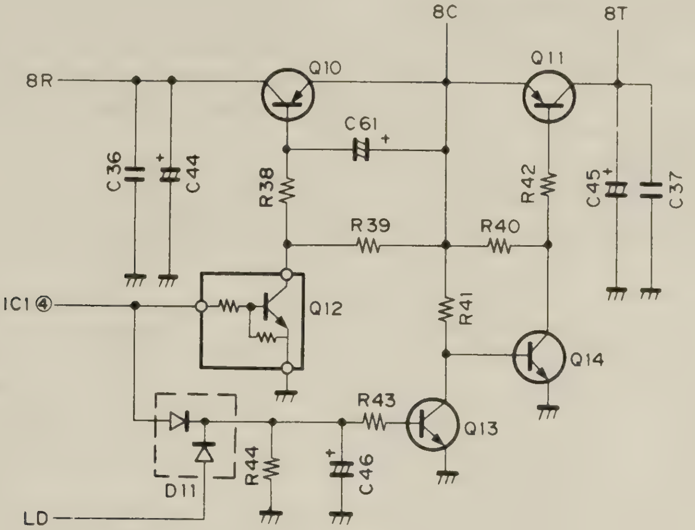
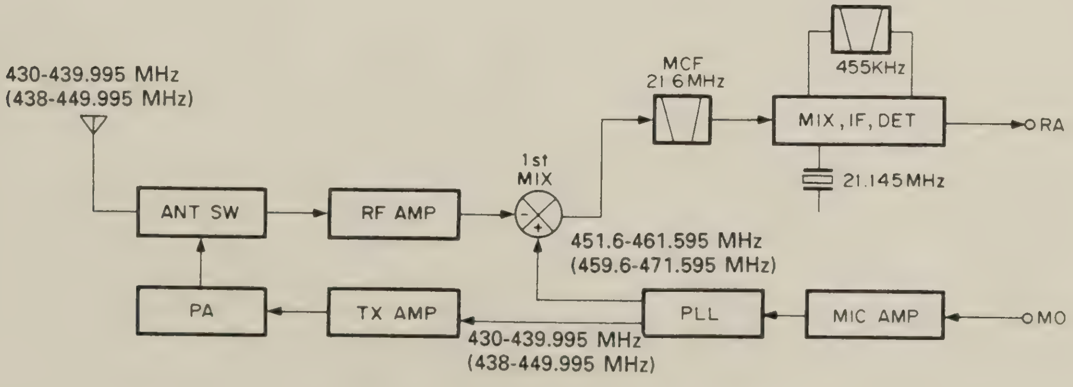


Fig. 4

430 TX-RX Unit Frequency Configuration

The 430 MHz unit incorporates a digital variable-frequency oscillator (VFO) that can freely select a channel step of 5, 10, 12.5, 15, 20, or 25 kHz with a PLL synthesizer system. The frequency in the receive signal channel is mixed with a first local oscillation frequency of 451.6-461.595 MHz (459.6-471.595 MHz for K-models) to produce a first intermediate frequency of 21.6 MHz. The frequency is then mixed with a second local oscillation frequency of 21.145 MHz to produce a second intermediate frequency of 455 kHz. This is called a double-conversion system.

The signal in the transmission channel is directly oscillated and frequency-divided by a PLL circuit, amplified by a straight amplifier, then transmitted.



* The alphanumeric characters enclosed in parentheses are used for K-models.

Fig. 5 Frequency Configuration

CIRCUIT DESCRIPTION

430 TX-RX Unit Receive Signal Channel

- **Outline**

A 430 MHz band antenna input signal is passed through the antenna selection diode in the final stage and sent through a front-stage antenna matching coil to the high-frequency two-stage amplifier and helical block of a GaAs (gallium arsenide) FET and junction FET. The signal is then input to the first mixer. The first mixer input signal is mixed with the first local signal from the PLL circuit and converted to a first intermediate-frequency signal of 21.6 MHz. The unwanted near-by signal components are then eliminated by a two-stage MCF.

The first intermediate-frequency signal is amplified and input to FM IF HIC IC1 (KCD04). This signal is then mixed with a second local oscillation frequency of 21.145 kHz to produce a second intermediate frequency of 455 kHz. The unwanted near-by components of the intermediate-frequency signal are eliminated by an FM ceramic filter. The intermediate-frequency signal is input to IC1 again. The second intermediate-frequency signal is amplified and detected by IC1 to produce an audio signal.

- **Signal-strength meter**

The signal-strength meter output voltage of FM IF HIC IC1 (KCD04) is supplied to the control unit.

- **Shift-register circuit**

The ES, CK, and DT serial data from the control unit are sent to IC3 (BU4094BF) to perform the control operation outlined in the following table:

Pin No.	Name	Function	Pin No.	Name	Function
1	Strobe	Enable input	9	Q_S	
2	Data	Serial data input	10	Q'_S	
3	Clock	Clock input	11	Q8	
4	Q1	TX/RX selection. "L" when TX is set	12	Q7	
5	Q2	TX power selection. "L" when middle and low. "H" when high.	13	Q6	
6	Q3	TX power selection. "L" when high and low. "H" when middle.	14	Q5	
7	Q4		15	OE	8V
8	V_{ss}	GND	16	V_{DD}	8V

Table 5

CIRCUIT DESCRIPTION

430 TX-RX Unit Transmit Signal Channel

- **Outline**

In the transmission channel, the desired frequency is directly oscillated and directly frequency modulated by means of a varicap diode.

- **Modulator circuit**

The audio signal from the control unit is input to microphone amplifier HIC IC2 (KCA04). IC4 consists of a preemphasis circuit, amplifier, limiter, and splatter circuit that eliminate unwanted high-frequency components. The VCO signal is directly frequency modulated by a varicap diode in the frequency modulator circuit.

- **Younger-stage circuit**

The signal output from the VCO is input to drive circuit HIC IC6 (KCB14). The amplifier can obtain a stable drive output without adjustment because it has a wide band. An APC circuit controls the collector voltage in the younger final stage.

- **Power amplifier circuit**

A drive signal is input to power module IC7 and amplified to the specified level.

- **APC circuit**

The automatic transmission output control circuit (APC) detects and partially amplifies the power module output with a diode and controls the output control voltage. The control voltage is output in inverse proportion to the output, so the control voltage output is always constant. To protect the set against excessive temperature rise, the high-power unit has a thermal switch. The high-power unit is automatically set to a low power by the thermal switch when it exceeds the specified temperature.

430 TX-RX Unit PLL Synthesizer

The VCO and PLL circuit are housed in a solid shielding case as a hybrid integrated circuit. Comparison frequencies of 6.25 and 5 kHz are produced by dividing a 12.8 MHz reference oscillation frequency by 2048 and 2560 to correspond to 5, 10, 12.5, 15, 20, or 25 kHz channel steps.

For 430 MHz, the relationship between f_{VCO} (RX) and each frequency division ratio is given by

$f_{VCO} = (430 + 21.6) = \{(n \times 128) + A\} \times f_{OSC} \div R$

Where: f_{VCO} = VCO output frequency

n: Binary 10-bit programmable counter setting value

A: Binary 7-bit programmable counter setting value

f_{OSC} = Reference oscillation frequency of 12.8 MHz

R: Binary 14-bit programmable counter setting value

2560 (in 5, 10, 15,and 20 kHz steps)

2048 (in 12.5 and 25 kHz steps)

In 5, 10, 15, and 20 kHz steps, n is 705 and A is 80.

Therefore, $f_{VCO} = \{705 \times 128\} \times 12800 / 2560$

$= \{90240 + 80\} \times 5$

$= 451600$

$= 451.6$ MHz

See the 144 MHz band unit (X57-3580-00) for the function of each pin of IC10 in the PLL circuit.

- **8T (8 V during transmission) and unlock signal**

See the 144 TX/RX unit description on page 5. (The figure on the under indicates the 430 MHz unit.)

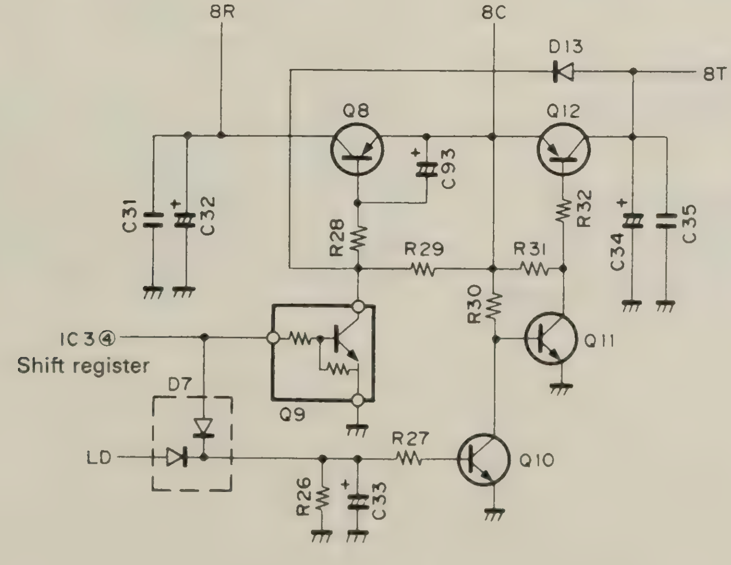


Fig. 6

CIRCUIT DESCRIPTION

1200 TX-RX Unit Frequency Configuration

The 1200 MHz unit incorporates a digital variable-frequency oscillator (VFO) that freely can select a channel step of 10, 12.5, 20,or 25 kHz with a PLL synthesizer system.

The frequency in the receive signal channel is mixed with a frequency of 1200.3 to 1240.20 MHz obtained when a first local oscillation frequency of 600.15 to 620.145 MHz is multiplied by 2 to produce a fist intermediate frequency of 59.7 MHz. This frequency is then mixed with a second local oscillation frequency of 59.245 MHz to produce a second intermediate frequency of 455 kHz. This is called a double-conversion system.

The signal in the transmission channel is oscillated and frequency-divided by a PLL circuit,then multiples the frequency of 630 to 649.995 MHz by two to produce a frequency of 1260 to 1299.99 MHz. This signal is amplified by a straight amplifier, then transmitted.

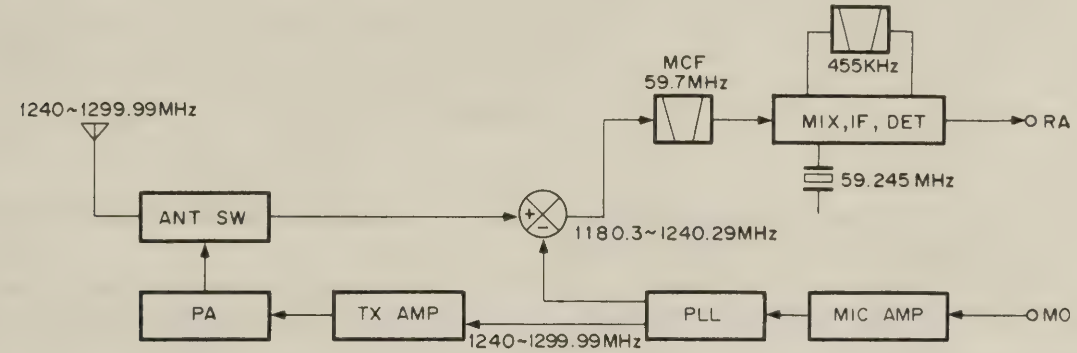


Fig. 7 Frequency Configuration

1200 TX-RX Unit Receive Signal Channel

- **Outline**

The received signal from an antenna is passed through a low-pass filter in the transmission final stage and sent through a transmission/reception selection diode switch to the receiving front end. The signal is then amplified to high frequencies by a microwave GaAs (gallium arsenide) FET and sent to a dielectric filter. The unwanted components of the signal are eliminated by a microwave transistor in another stage and the dielectric filter. The resultant signal is input to the first mixer. The front end block is matched by a microstrip line to ensure high sensitivity and high reliability. A GaAs FET is used in the first mixer to obtain a good two-signal characteristic. This signal is mixed with the first local signal from a PLL circuit by the first mixer and converted to a first intermediate frequency of 59.7 MHz. The unwanted near-by signal components are eliminated by a two-stage MCF. The resultant signal is produced as a first intermediate-frequency signal.

The first intermediate-frequency signal is amplified and input to FM IF HIC IC2 (KCD04). This signal is then mixed with a second local oscillation frequency of 59.245 kHz to produce a second intermediate frequency of 455 kHz. The intermediate-frequency signal is passed through a ceramic filter to obtain a sharp characteristic. The signal is then input to an HIC again, amplified, then demodulated and output from the HIC.

- **Signal-strength meter**

The signal-strength meter output voltage of FM IF HIC IC2 (KCD04) is supplied to the control unit.

- **Shift-register circuit**

The FS, CK, and DT serial data from the control unit are sent to IC5 (BU4094BF) to perform the control operation outlined in the following table:

Pin No.	Name	Function	Pin No.	Name	Function
1	Strobe	Enable input	9	Q_S	
2	Data	Serial data input	10	Q'_S	
3	Clock	Clock input	11	Q8	TX/RX selection. "L" when TX is set (Set low faster than Q1).
4	Q1	TX/RX selection. "L" when TX is set	12	Q7	ALT. "H" when on.
5	Q2	TX power selection. "L" when middle and low. "H" when high.	13	Q6	
6	Q3	TX power selection. "L" when high and low. "H" when middle.	14	Q5	
7	Q4		15	QE	8V
8	V_{ss}	GND	16	V_{DD}	8V

Table 6

1200 TX-RX Unit Transmit Signal Channel

- **Outline**

In the transmission channel, the desired frequency is oscillated by half and directly frequency modulated by means of a varicap diode.

- **Modulator circuit**

The audio signal from the control unit is input to microphone amplifier HIC IC4 (KCA04). IC4 consists of a preemphasis circuit, amplifier, limiter, and splatter circuit that eliminate unwanted high-frequency components. The VCO signal is directly frequency modulated by means of a varicap diode in the frequency modulator circuit.

- **Younger-stage circuit**

The signal output from the VCO is input to predrive circuit IC7 (KCB09). The amplifier can obtain a stable drive output without adjustment because it has a wide band.

- **Power amplifier circuit**

The signal amplified in the predrive stage is amplified again by drive circuit HIC IC8 (KCB10), then input to power module IC10 and amplified to the specified level.

- **APC circuit**

The automatic transmission output control circuit (APC) detects and partially amplifies the power module output with a diode and controls the output control voltage. The control voltage is output in inverse proportion to the output, so the control voltage output is always constant.

- **Antenna selection circuit**

Figure 8 shows the antenna selection circuit. The receiver circuit obtains a low insertion loss and isolation with a two-stage breaker circuit consisting of a λ/4 strip circuit.

The pin diode used as a switching device has a low junction capacitance. The high-frequency capacitance of the diode does not depend on the reverse bias voltage.

Figure 9 shows the equivalent circuit during transmission. A current flows through each diode using 8T. The impedance becomes very low. At that time, the receiver side uses a λ/4 strip circuit. Therefore, the impedance becomes very high when the receiver side is viewed from point (A). The voltage from a power module is transferred to the antenna. Figure 10 shows the equivalent circuit during reception. The bias is switched off, so each diode is in a high-resistance state. The antenna and receiving circuit are connected by a strip line.

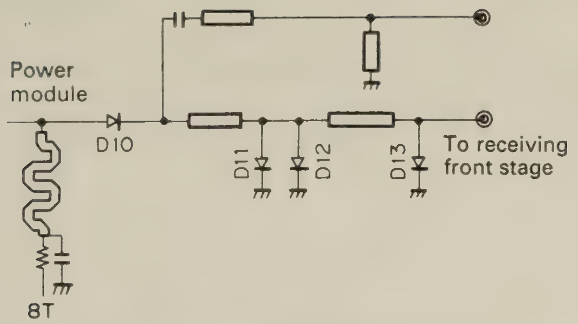


Fig. 8 Antenna Selection Circuit

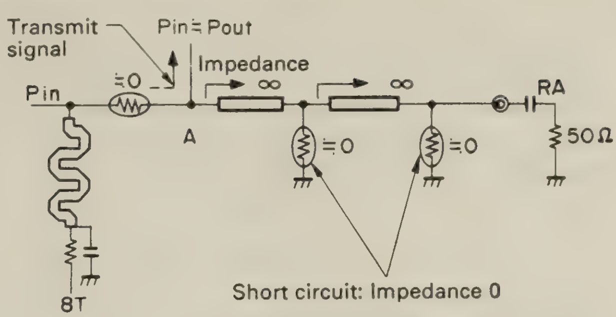


Fig. 9 Equivalent Circuit during Transmission

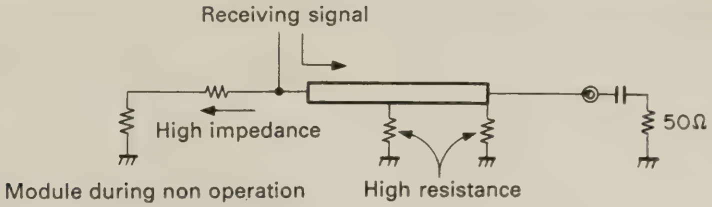


Fig. 10 Equivalent Circuit during Reception

1200 TX-RX Unit PLL Synthesizer

The VCO and PLL circuit are housed in 2 solid shielding case as a hybrid integrated circuit. This reduces the electrical and mechanical influence and ensures frequency stability.

The VCO and PLL circuit double the higher harmonics by oscillating and locking a 600 MHz frequency to produce a 1200 MHz band frequency. Comparison frequencies of 5 kHz and 6.25 kHz are produced by dividing a 12.8 MHz frequency of the TCXD by 2560 and 2048 to correspond to 10, 12.5, 20, and 25 kHz channel steps.

The relationship between f_{VCO} (RX) and each frequency division is given by

$$f_{VCO}\,(RX) = (f_{RX} - 59.7) / 2 = \{(n \times 128) + A\} \times f_{OSC} \div R$$

Where: f_{VCO} (RX) = Previous output frequency that is multiplied by 2 during VCO reception

f_{RX} : Reception frequency

n : Binary 10-bit programmable counter setting value

A : Binary 7-bit programmable counter setting value

f_{OSC}: Reference oscillation frequency of 12.8 MHz (TXCO)

R : Binary 14-bit programmable reference counter setting value

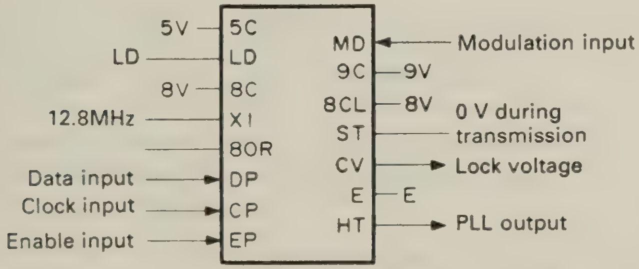
2048 (in 12.5 and 25 kHz steps)

2560 (in 10 and 20 kHz steps)

For 1260 MHz,

$$\begin{aligned} f_{VCO}(RX) &= (1260 - 59.7) \\ &= \{(n \times 180) + A\} \times 12800 \div 2560 \\ &= 600.15 \text{ MHz} \end{aligned}$$

In this case, n is 937 and A is 94.



The same as for the 144 MHz unit except 8 V shown in the figure above.

Fig. 11 PLL pin description

Pin name	Function	Pin name	Function
5C	5V	MO	Modulation signal input
LD	Lock signal (on during lock)	10V	10V
NC	Unused	8CL	8V (ripple filter)
XI	12.8 MHz crystal oscillation	ST	0 V during transmission
XO		CV	Lock voltage
DP	Data input	E	GND
CP	Clock input	HT	VCO output
EP	Enable input		

Table 7

CIRCUIT DESCRIPTION

- **Unlock circuit**

When a PLL circuit is unlocked during transmission, the LD pin of a IC11 set low and Q12 is set off. Q11 is then set on. The 8T line is not activated when 8T switching control circuit Q13 is set off.

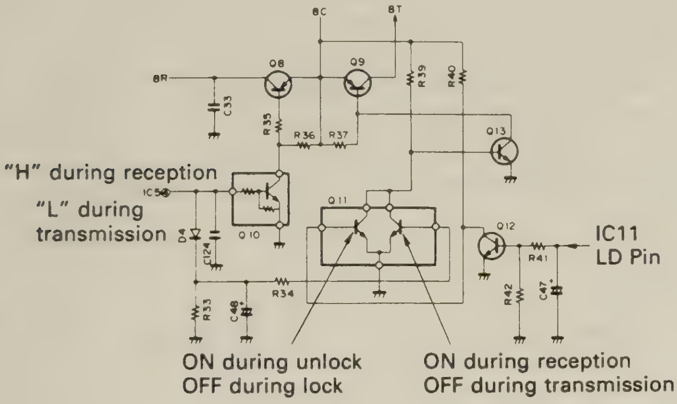


Fig. 12 Unlock Circuit

- **Predrive circuit HIC (KCB09)**

The VCO output is amplified by Q22, then input to pre-drive circuit HIC IC7. An average 22 to 23 dBm output is obtained by inputting 0 dBm through three-stage (2SC4093 and 2SC3357 x 2) amplification. An alumina board and hybrid integrated circuit are used to ensure stable circuit operation.

- **Drive circuit HIC (KCB10)**

The VCO output is amplified by KCB09, then input to drive circuit HIC. An average 29 dBm output is obtained by inputting 20 dBm through one-stage (2SC3814) amplification. An integrated radiation plate and alumina board are used to attain a stable output against heating.

- **ALT**

It is almost the same circuit construction as the TM-531A/E.

Refer to page 6 in the TM-531A/E service manual for more information.

Digital Control Block

- **Outline**

The digital control block is classified into a panel block and control unit block. The panel block consists of a key, rotary encoder input circuit, and display circuit. The control unit block consists of reset and backup circuits, a tone output circuit, and a microphone tone input circuit.

- **Panel and control unit data communication circuit**

Figure 13 shows the panel and control unit data communication circuit. The S0 pin indicates serial data output and the S1 pin serial data input. An inverter is inserted for microcomputer port protection.

The data communication system is asynchronous, and the communication data rate is 19,200 bps. This data rate is about 16 times that of RC-20 and about 4 times those of other companies. The connection is checked every 0.5 second by a microcomputer on the control unit. Therefore, the power is switched off when the panel block is removed.

Panel Block

- **Key and rotary encoder input circuit**

For keys on the panel block, one key entry data item is input to one port. A pull-up resistor is inserted by software. The rotary encoder is directly connected to a microcomputer.

- **Display circuits**

The display circuits are on the panel block and are processed by a microcomputer on the panel. The display circuits consist of two LCD drivers and their peripheral circuit.

The LCD indicators dynamically light at a duty ratio of 1/2. The LCD ON data is transferred in series from the BP5, BP6, and BP7 pins of the CPU to the LCD driver. The number of segments is 137.

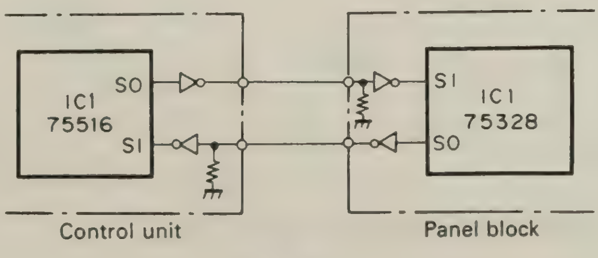


Fig. 13

CIRCUIT DESCRIPTION

- **Dimmer circuit**

The dimmer circuit can change the lamp brightness in four steps. Figure 14 shows the dimmer circuit. Q2 is an error amplifier of the regulated power supply. A 5 V voltage is used as a reference voltage. P52 and P53 are open drains of a microcomputer. A four-step voltage can be output by connecting the P52 and P53 ports to ground. P50 connected to the emitter of A3 is also an open drain. When the P50 port is open, Q3 is set off and no lamp voltage is output. When the P50 port is connected to ground, Q3 is activated and the lamp goes on.

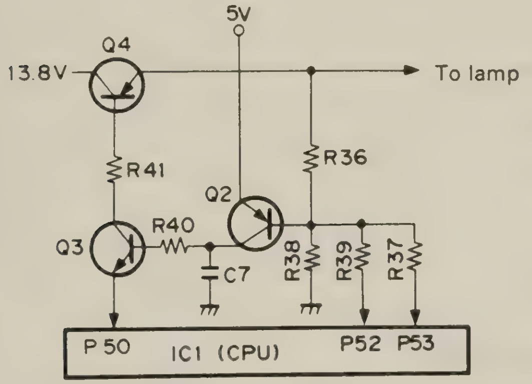


Fig. 14 Dimmer circuit

- **Reset and backup circuits**

A low pulse of about 3 ms is output from the reset circuit when the power is switched on. This low pulse is input to the RESET pin of the microcomputer. A power on reset is then made.

A drop in the 13.8 V line voltage is detected by the backup circuit when the power is switched off. The INT4 pin of the microcomputer is then set high. Consequently, the microcomputer enters the backup state.

Control Unit Block

- **Microphone key input circuit**

Microphone UP/DOWN keys and function keys are connected to the analog input pins of a microcomputer. Each function is activated by the voltage generated when the keys are set on.

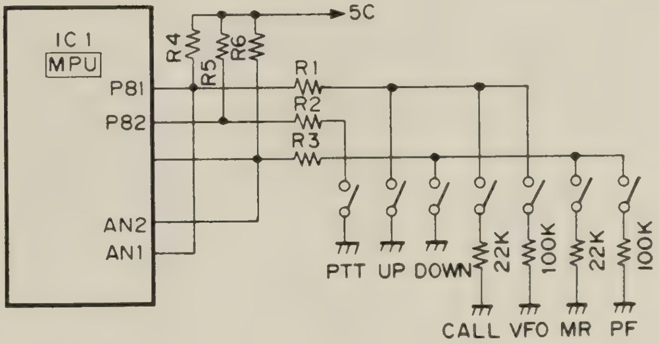


Fig. 15 Microphone key Input Circuit

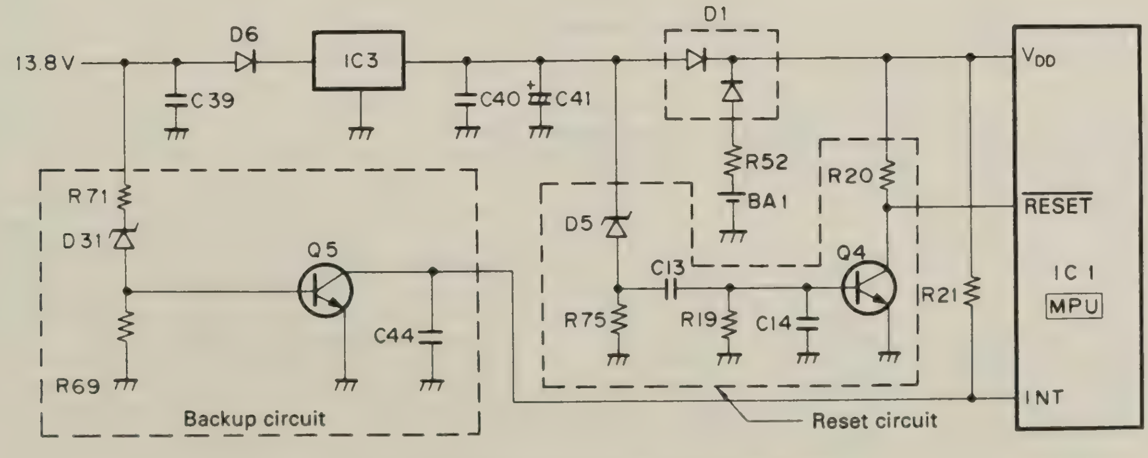


Fig. 16 Reset and Backup Circuits

CIRCUIT DESCRIPTION

- **Shift-register circuit**

The serial data from the microcomputer is passed through IC6 and IC7 (BU4094BF) to perform the following control operation.

Shift-Register Port Specification List (Common)

Shift-register A 4094

S.Reg Port	Pin No.	Port data	SA VE	Back up	Function	Pin name
Q1	4	PD_BZA			BAND A beep 0: Sounds 1: Does not sound	BZA
Q2	5	PD_BZA			BAND B beep 0: Sounds 1: Does not sound	BZB
Q3	6	PD_BZA			BAND C beep 0: Sounds 1: Does not sound	BZC
Q4	7	PD_MUTEA			BAND A MUTE 0: OFF 1: ON	MUTEA
Q5	14	PD_MUTEB			BAND B MUTE 0: OFF 1: ON	MUTEB
Q6	13	PD_MUTEC			BAND C MUTE 0: OFF 1: ON	MUTEC
Q7						
Q8	11	PD_BANK			SRAM A12 0: Normal 1: Abnormal	BANK

Shift-register B 4094

S.Reg Port	Pin No.	Port data	SA VE	Back up	Function	Pin name
Q1	4	PD_CTC1			CTCSS operation unit selection *1	CTC1
Q2	5	PD_CTC2			CTCSS operation unit selection *1	CTC2
Q3	6	PD_RD1			Detection output connection unit selection *3	RD1
Q4	7	PD_RD2			Detection output connection unit selection *3	RD2
Q5	14	PD_DTS1			DTSS operation unit selection *2	DTS1
Q6	13	PD_DTS2			DTSS operation unit selection *2	DTS2
Q7	12					
Q8	11	PD_DTSEL			DTSS input selection 0: Detection output 1: MIC	DTSEL

*1, *2, *3

CTC2	CTC1	CTCSS operation unit
DTS2	DTS1	DTSS operation unit
RD2	RD1	Detection output connection unit
0	0	A
0	1	B
1	x	C

CIRCUIT DESCRIPTION

I/O Port Specification List

μPD75516 I/O port list

μCOM Port	Port	I/O	Pull Up	Back up	Description	Pin name
INT4 P00	P_VF	I			Power check 0: Operation 1: Backup	
SCK0 P01	P_RFMID	I	○		Lower-power unit TX power selection 0: Three stages (middle stage) 1: Two stages (no middle stage)	
SO0/SB0 P02	P_SO	O	○		Panel microcomputer SI	
S10/SB1 P03	P_SI	I	○		Panel microcomputer SO	
INT0 P10		I		I		
INT1 P11	P_CTCSS	I		I	CTCSS detection 0: Tone coincides 1: Tone does not coincide	SDO
INT2 P12	P_STD	I		I	DTMF detection (LC7385 standard) 0: No signal 1: Signal detected	DV
T10 P13	P_DTSCHK	I		I	DTSS connection check 0: No connection 1: Connection	VCK
PTO0 P20	P_BEEP	O		L	Beep sound output pin (effect sound) Set low when no beep sound is output.	BZ
P21	P_DTOE	O		L	DTMF receiver LC7385 TOE	EN
PCL P22	P_DTCE	O		L	DTMF tone generator TP5088 CE	CE
BUZ P23	P_CLK	O		L	CTCSS unit/shift register/electronic volume clock	CK
P30	P_ET	O I		I	CTCSS unit enable connection check 0: Connection 1: No connection	ET
P31						
P32	P_FANDL0	I	Δ	I	FAN delay time setting input *1	
P33	P_FANDL1	I	Δ	I	FAN delay time setting input *1	
P40	P_DAT0	I/O	●	I	External RAM, I/O expander data, and DTMF data (D0/Q1)	
P41	P_DAT1	I/O	●	I	↑ (D1/Q2)	
P42	P_DAT2	I/O	●	I	↑ (D2/Q3)	
P43	P_DAT3	I/O	●	I	↑ (D3/Q4)	
P50	P_DAT4	I/O	●	I	External RAM and I/O expander data	

CIRCUIT DESCRIPTION

μPD75516 I/O List

μCOM Port	Port	I/O	Pull Up	Back up	Description	Pin name
P51	P_DAT5	I/O	●	I	↑	
P52	P_DAT6	I/O	●	I	↑	
P53	P_DAT7	I/O	●	I	↑	
KR0 P60	P_TONE	O		I	Subtone output bit 0	
KR1 P61	P_TONE	O		I	Subtone output bit 1	
KR2 P62	P_TONE	O		I	Subtone output bit 2	
KR3 P63	P_TONE	O		I	Subtone output bit 3	
KR4 P70	P_TONE	O		I	Subtone output bit 4	
KR5 P71	P_TONE	O		I	Subtone output bit 5	
KR6 P72	P_TONE	O		I	Subtone output bit 6	
KR7 P73	P_TONE	O		I	Subtone output bit 7	
PPO P80						
SCK P81	P_UP	I	●	I	Microphone up	
SO1 P82	P_PTT	I	●	I	Microphone PTT	
S11 P83	P_DOWN	I	●	I	Microphone down	
P90	P_A0	O		I	External RAM and I/O expander address (IOEADR)	
P91	P_A1	O		I	↑ (RAMADRL)	
P92	P_A2	O		I	↑	
P93	P_A3	O		I	External RAM address	
P100	P_A4	O		I	↑ (RAMADRH)	
P101	P_A5	O		I	↑	
P102	P_A6	O		I	↑	
P103	P_A7	O		I	↑	

µPD75516 I/O Port List

µCOM Port	Port	I/O	Pull Up	Back up	Description	Pin name
P110	P_A8	O		I	↑	
P111	P_A9	O		I	↑	
P112	P_A10	O		I	↑	
P113	P_A11	O		L	↑	
P120	P_RAMOE	O	●	H	External RAM OE (L) L: Read	OE
P121	P_RAMRW	O	●	H	External RAM R/W L: Write H: Normal	R/W
P122	P_RAMCE2	O	●	L	External RAM CE2 L: Backup	CE2
P123	P_10CS	O	●	L	I/O Expander CS(L)	CS
P130	P_10RD	O	●	I	I/O Expander RD(L)	RD
P131	P_10WR	O	●	I	I/O Expander WR(L)	WR
P132	P_VOLEN1	O	●	I	Electronic volume enable 1 L: Buzzer R: Band C	EV1
P133	P_VOLEN2	O	●	I	Electronic volume enable 2 L: Band B R: Band A	EV2
P140	P_ES	O		I	Shift Register Enable	ES
P141	P_MMUTE	O		I	Mic MUTE 0: MUTE OFF 1: MUTE ON	
P142	P_PSW	O		I	POWER switch 0: Power on 1: Power off	PSW
P143	P_DAT	O		I	CTCSS unit, shift register,and electronic volume data	DT
AN0	P_DNAN	I			DOWN, MR, PF key input	
AN1	P_UPAN	I			UP, CALL, and VFO key input	
AN2	P_SMA	I			Band unit A signal-strength meter input	
AN3	P_ALTA	I			Band unit A ALT input	
AN4 P150	P_SMB	I			Band unit B signal-strength meter input	
AN5 P151	P_ALTB	I			Band unit B ALT input	
AN6 P152	P_SMC	I			Band unit C signal-strength meter input	
AN7 P153	P_ALTC	I			Band unit C ALT input	

Δ : Pulled up by software during check (note that P_ET is set high during check).
O : Pulled up by software at all times.
● : Pulled up by hardware.

*1 FAN delay time setting input

FAN control	P_FANDL1	P_FANDL0
Always on during power-on sequence	0	0
On during transmission	0	1
On during transmission and for 1 minute after transmission	1	0
On during transmission and on for 2 minutes after transmission	1	1

CIRCUIT DESCRIPTION

I/O Expander Port Specification List

CXD1095Q I/O port list

Port	I/O	Back up	Description	Pin name
PA0	I/O		BAND Unit C PLL Enable *3	EPC
PA1			BAND Unit C PLL/Shift Register Clock *3	CKC
PA2			BAND Unit C PLL/Shift Register Data *3	DTC
PA3			BAND Unit C Shift Register Enable	ESC
PA4	I		BAND Unit A busy input 0: Busy 1: Close	SCA
PA5			BAND Unit B busy input 0: Busy 1: Close	SCB
PA6			BAND Unit C busy input 0: Busy 1: Close	SCC
PA7				
PB0	O		BAND Unit C SQ Out bit0	SQC0
PB1			BAND Unit C SQ Out bit1	SQC1
PB2			BAND Unit C SQ Out bit2	SQC2
PB3			BAND Unit C SQ Out bit3	SQC3
PB4			BAND Unit B SQ Out bit0	SQB0
PB5			BAND Unit B SQ Out bit1	SQB1
PB6			BAND Unit B SQ Out bit2	SQB2
PB7			BAND Unit B SQ Out bit3	SQB3
PC0	O		BAND Unit A SQ Out bit0	SQA0
PC1	O		BAND Unit A SQ Out bit1	SQA1
PC2	O		BAND Unit A SQ Out bit2	SQA2
PC3	O		BAND Unit A SQ Out bit3	SQA3
PC4	O		BAND Unit A SQ Out bit4	SQA4
PC5	O		BAND Unit A SQ Out bit5	SQA5
PC6	O		BAND Unit B SQ Out bit4	SQB4
PC7	O		BAND Unit B SQ Out bit5	SQB5
PD0	I/O		BAND Unit A PLL Enable *1	EPA
PD1			BAND Unit A PLL/Shift Register Clock *1	CKA
PD2			BAND Unit A PLL/Shift Register Data *1	DTA
PD3			BAND Unit A Shift Register Enable	ESA
PD4			BAND Unit B PLL Enable *2	EPB
PD5			BAND Unit B PLL/Shift Register Clock *2	CKB
PD6			BAND Unit B PLL/Shift Register Data *2	DTB
PD7			BAND Unit B Shift Register Enable	ESB
PE0	O		FAN ON/OFF 0: OFF 1: ON	FANSW
PE1			PSW other than 5C	OSW2
PE2			BAND Unit C SQ Out bit4	SQC4
PE3			BAND Unit C SQ Out bit5	SQC5

CIRCUIT DESCRIPTION

*1, *2, *3 Type of band unit

BAND Unit	DT×	CK×	EP×	Unit No.	No. of data items after conversion
No unit	0	0	0	0	0
	1	0	0	4	1
	1	1	0	6	2
144MHz BAND	0	1	1	3	3
220MHz BAND	0	1	0	2	4
430MHz BAND	1	0	1	5	5
1200MHz BAND	0	0	1	1	6
	1	1	1	7	7

Note:

An × indicates A, B, or C. The number of data items after conversion indicates the data used in a program.

CIRCUIT DESCRIPTION

I/O Port Specification List

μPD75328 I/O port list

μCOM Port	Port	I/O	Pull up	Back up	Description	Pin name
INT4 P00	P_VF	I			Power check 0: Stop mode 1: Operation	
SCK P01	P_IF	I	Δ		IF selection check (430 MHz band only) 0: 21.8 MHz 1: 21.6 MHz (initial value)	
SO/SB0 P02	P_SO	O			Main microcomputer SI	
S1/SB1 P03	P_SI	I			Main microcomputer SO	
INT0 P10	↑	I	○		Connected to P_SI.	
INT1 P11	P_ENCA	I	○		Encoder clock (interrupt)	
INT2 P12	P_ENCB	I	○		Encoder data	
T10 P13	P_KEY17	I	○		BAND SEL C Key	
PTO0 P20	P_KEY16	I	○		BAND SEL B Key	
P21	P_KEY15	I	○		BAND SEL A Key	
PCL P22	P_KEY14	I	○		CONT SEL C Key	
BUZ P23	P_KEY13	I	○		CONT SEL B Key	
LCDCL P30	P_KEY12	I	○		CONT SEL A Key	
SYNC P31	P_KEY11	I	○		MUTE Key	
P32	P_KEY11	I	○		LOW Key	
P33	P_KEY9	I	○		DTSS Key	
P40	P_LEDTB	O			BAND Unit B control LED	
P41	P_LEDRB	O			BAND Unit B LED	
P42	P_LEDTC	O			BAND Unit C control LED	
P43	P_LEDRC	O			BAND Unit C LED	
P50	P_PSW	O			Power off during APO 0: Power on (during power on) 1: Power off	

CIRCUIT DESCRIPTION

µPD75328 I/O Port List

µCOM Port	Port	I/O	Pull up	Back up	Description	Pin name
P51	P_PSW	O			↑	
P52	P_DIM0	O			Dimmer selection *1	
P53	P_DIM1	O			Dimmer selection *1	
KR0 P60	P_KEY8	I	○		REV Key	
KR1 P61	P_KEY7	I	○		TONE (CTCSS) Key	
KR2 P62	P_KEY6	I	○		BELL [SHIFT] Key	
KR3 P63	P_KEY5	I	○		F Key	
KR4 P70	P_KEY4	I	○		CALL Key	
KR5 P71	P_KEY3	I	○		MHz Key	
KR6 P72	P_KEY2	I	○		MR/M Key	
KR7 P73	P_KEY1	I	○		VFO Key	
P80	P_B0	I	○		Destination input b0	
P81	P_B1	I	○		Destination input b1	
P82	P_B2	I	○		Destination input b2	
P83	P_B3	I	○		Destination input b3	
S24 BP0	P_BLANK	O			LCD Driver MSM5265 BLANK	BLANK
S25 BP1	P_LEDTA	O			BAND Unit A Control LED	
S26 BP2	P_LEDRA	O			BAND Unit A LED	
S27 BP3	P_FDSP	O			Function display 0: Others 1: Function mode	
S28 BP4	P_TEST	O			LCD Driver MSM5265 SEG-TEST	TEST
S29 BP5	P_LCDDT	O			LCD Driver MSM5265 DATA	DL

CIRCUIT DESCRIPTION

μPD75328 I/O Port List

μCOM Port	Port	I/O	Pull up	Back up	Description	Pin name
S30 BP6	P_LCDCK	O			LCD Driver MSM5265 CLOCK	CL
S31 BP7	P_LCDCLD	O			LCD Driver MSM5265 LOAD	EL
AN0	P_VOLA				BAND Unit A VOL Input	VOLA
AN1	P_SQA				BAND Unit A SQ Input	SQA
AN2	P_VOLB				BAND Unit B VOL Input	VOLB
AN3	P_SQB				BAND Unit B SQ Input	SQB
AN4	P_VOLC				BAND Unit C VOL Input	VOLC
AN5	P_SQC				BAND Unit C SQ Input	SQC

O: Always pulled up by software.
Δ: Pulled up by software during check

*1 Dimmer selection

Brightness	DIM1	DIM0
Lightest	0	0
Normal	0	1
Dark	1	0
Darkest	1	1

Initial value 01 (normal)

- **Tone output circuit**

The tone output signal is input from the P60 through P63 and P70 through P73 ports of the microcomputer to ladder resistor R8 and converted from digital to analog. The 38 waves in 67.0 to 250.3 MHz are then produced. Figure 17 shows the internal configuration of R8.

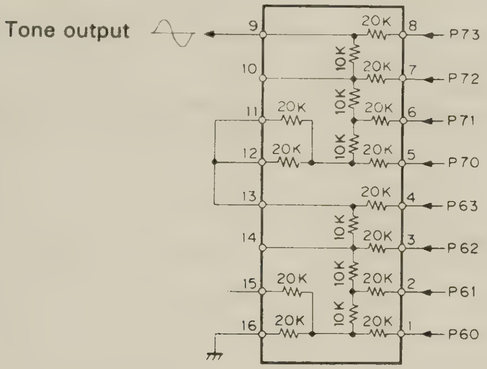


Fig. 17 Internal Configuration of Ladder Resistor (KRR-C001)

- **CTCSS unit input and output (TSU-7 (option))**

The data input to the CTCSS unit is output from P30, P23, and P143. P30 is also used for connection check. Data is input to P30 when the power is switched on. The data is output from P30 after a connection check is completed. The CTCSS unit is not set on when no connection is performed.

Figure 19 shows the data transfer format, and figure 20 shows the data configuration. A low signal is input to the P11 pin of the microcomputer when the tone detected from the CTCSS unit coincides. The squelch is then opened.

One CTCSS unit can correspond to three bands by switching detection signal RD output from a band unit.

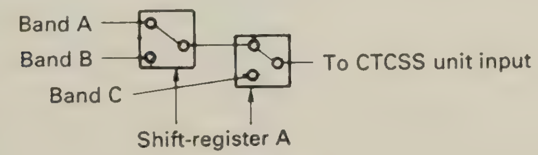


Fig. 18

As the figure above shows, the analog switch is selected with two-bit data.

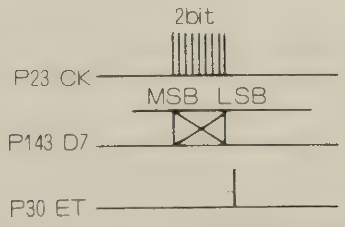


Fig. 19 CTCSS Data Transfer Format

Tone frequency selection data of CTCSS FX365

	D0	D1	D2	D3	D4	D5
Example 88.5 Hz (DTMF unit)	L	H	H	H	L	L

Fig. 20 CTCSS Data Configuration

- **DTMF unit input and output (DTU-2 (option))**

Data input to the DTMF unit is output from P21, P22, and P40 through P43 of the microcomputer. An encoder is activated when P40 through P43 output data and when P2 is high.

Similar to the CTCSS unit, when a decoder selects a detection signal and detects the input signal, a high signal is input to P12, P21 is set high, and data is input to P40 through P43. The microcomputer then judges whether the data coincides with a DTSS code.

- **PLL data output**

The PLL data is passed through I/O expander IC101 (CXD1095Q) from the microcomputer and output to each band unit with EP, CK, and DT signals and three serial data items.

A PLL IC (M56760FP) is used in common with the 144 and 430 TX/RX units. Figure 21 shows the data configuration. Figure 22 shows the PLL data transfer format.

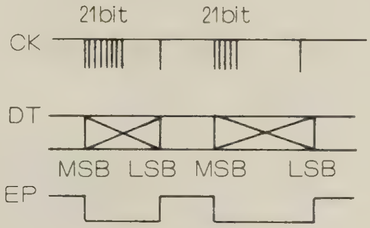
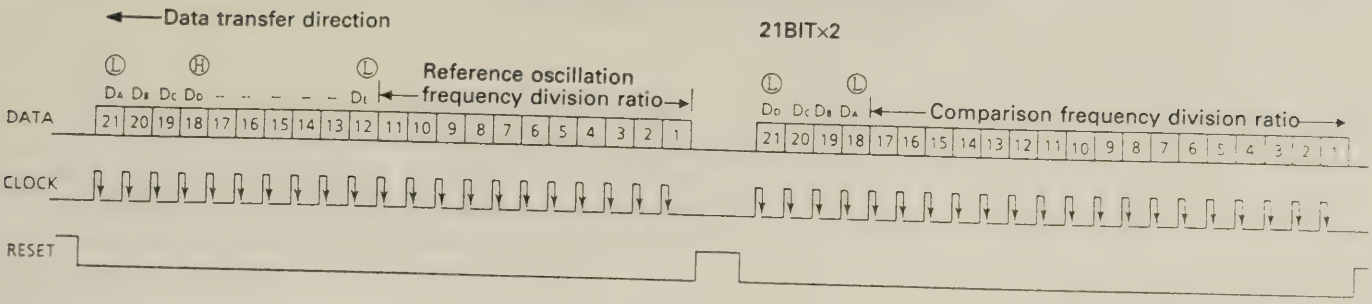


Fig. 21 PLL Data Configuration

CIRCUIT DESCRIPTION



f_{REF} = 12800 ÷ (8 x Reference oscillation frequency division ratio)

Reference oscillation frequency division ratio = 16000 / f_{REF} (kHz)

5 kHz .... P = 320
6.25 kHz ..... P = 256

Reference oscillation frequency division ratio
1 2 3 4 5 6 7 8 9 10 11
0 0 0 0 0 0 1 0 1 0 0 (320)
0 0 0 0 0 0 0 0 1 0 0 (256)

17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 01 40 5 kHz
0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 01 00 5.25 kHz

Special bit function

Bit	Name	H	L
D_A	Data latch selection	Reference	Comparison
D_B	SW2	H: OFF	L: ON
D_C	SW1	H: OFF	L: ON
D_D	POWER switch	OFF	ON
D_E	Test	Test	Normal

PLL data-to-bit relationship

ADD	BIT			
	0	1	2	3
1BH	1	2	3	4
1CH	5	6	7	8
1DH	9	10	11	12
1BH	13	14	15	16
1FH	17	–	–	–

Fig. 22 M56760 PLL DATA

1F	1E	1D	1C	1B	1A
–	6	10	14	18	1
–	7	11	15	19	2
–	8	12	16	20	3
5	9	13	17	21	4

1F	1E	1D	1C	1B	1A
–	2^{15}	2^{11}	2^7	2^3	D_D
–	2^{14}	2^{10}	2^6	2^2	D_C
–	2^{13}	2^9	2^5	2^1	D_B
2^{16}	2^{12}	2^8	2^4	2^0	D_A

For frequency division ratio setting

1F	1E	1D	1C	1B	1A
–	×	D_E	2^7	2^3	D_D
–	×	2^{10}	2^6	2^2	D_C
–	×	2^9	2^5	2^1	D_B
×	×	2^8	2^4	2^0	D_A

For comparison frequency

Data	State
D_E	
L	Normal
H	Test

Data	PLL
D_E	POWER switch
L	ON
H	OFF

Data		Output port	
D_H	D_C	SW2	SW1
L	L	ON	ON
H	L	OFF	ON
L	H	ON	OFF
H	H	OFF	OFF

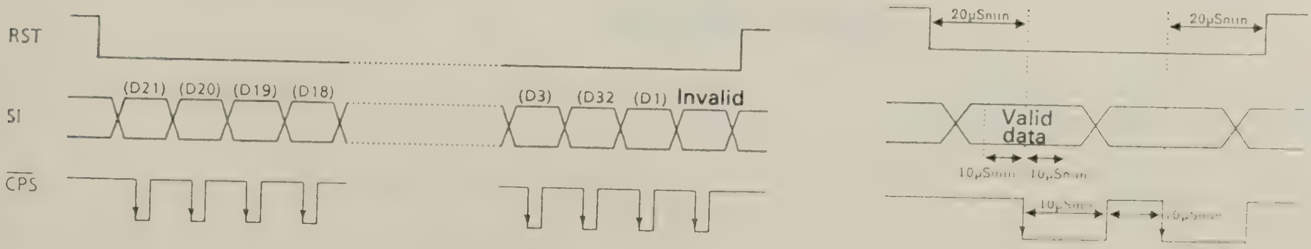


Fig. 23 M56760 PLL DATA OUTPUT

CIRCUIT DESCRIPTION

The PLL and reference frequency-division ratio data input to the 1200 TX/RX unit are output from P21 (CK), P22 (DT), and P23 (EP1) of the CPU. The reference frequency-division ratio data (R) is output only when the power is switched on and when 10 and 12.5 kHz reference frequencies are changed.

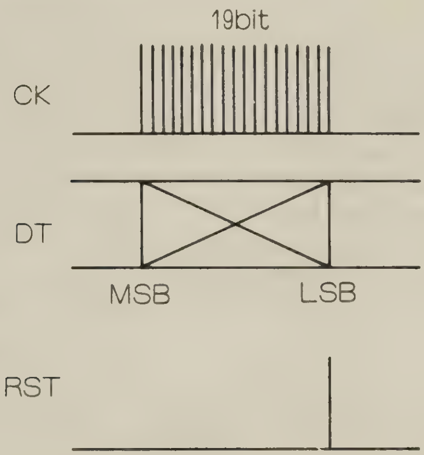


Fig. 24 PLL Frequency-Division Ratio Data Transfer Format

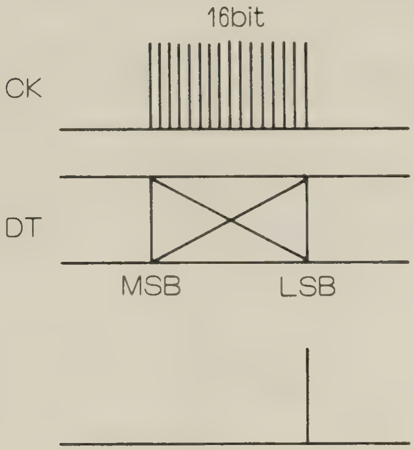


Fig. 25 Reference Frequency-Division Ratio Data Transfer Format

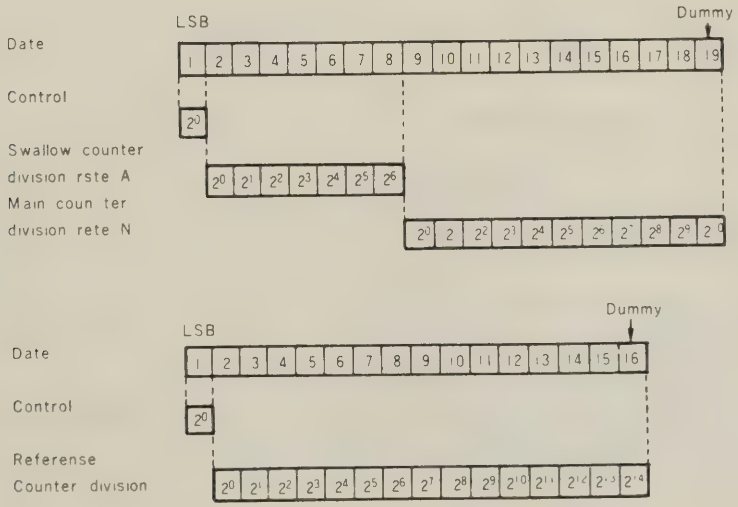


Fig. 26 Data Configuration

CIRCUIT DESCRIPTION

AF Signal Channel

- **Outline**

Detection signal RA from each band unit is passed through an electronic volume control and output to the power amplifier and speaker through a mute circuit, buzzer circuit, and speaker selection circuit.

Each band has an independent AF signal that can be output from the speaker in accordance with the speaker jack insertion position.

- **Volume control circuit**

The angle data of each band volume control on the panel is analog-to-digital converted by a microcomputer on the panel and converted to 5-bit data. The data from the panel block is sent to the microcomputer of the control unit, then converted. Serial data is then output from P132, P133, P23, and P143. Each band has an independent volume control. See the device function for the channel-to-band unit relationship. The data transfer format is the same as that for IF-20.

- **Buzzer circuit**

A pulse is output from P20 of IC1 to sound a buzzer when keys are pressed. The pulse is mixed with the DTMF unit output signal as a monitor pulse during DTSS operation.

After that, the pulse is passed through the electronic volume control and mixed with the AF signal in a mute circuit corresponding to each band before it is mixed with the AF signal line in each band.

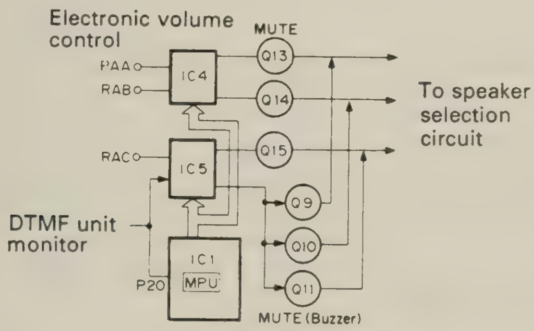


Fig. 27 Volume and Buzzer Circuits

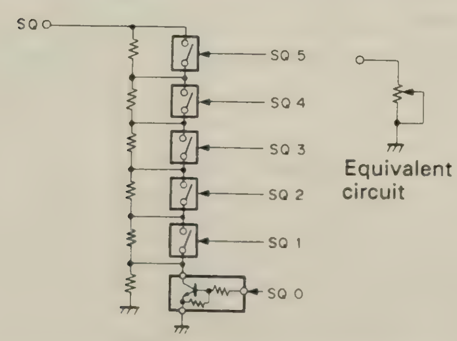


Fig. 29 Squelch D/A Converter Circuit

- **Speaker selection circuit**

Each band unit has three speaker jacks (on rear panel), and the control unit has one speaker jack (on side panel). When a speaker is connected to a speaker jack on the band unit, the corresponding band AF signal is output.

The speaker jack on the control unit outputs a remaining mixed AF signal. The mixed signal is output from an internal speaker when a speaker is not connected to this speaker jack. Figure 28 shows the speaker selection circuit.

A signal is input to adder IC103 when no speaker is connected. The signal level does not fluctuate even if one to three signals are input to the adder.

For example, band B can mix bands A and C with one speaker and output the mixed signal from another speaker by connecting the band B jack and control unit jack.

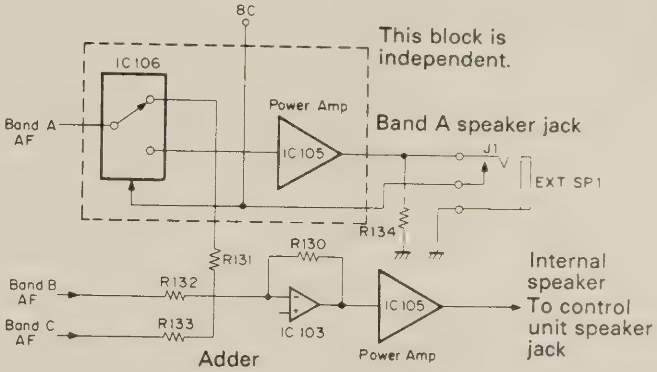


Fig. 28 Speaker Selection Circuit

- **Squelch circuit**

The angle data of each band squelch volume control on the panel is analog-to-digital converted and converted to 6-bit data.

The data from the panel block is sent to the microcomputer of the control unit and passed through I/O expander IC101 from the microcomputer. The data is then digital-to-analog converted by the analog switch shown in Figure 29. Each band in the circuit shown in Figure 29 is independent.

CIRCUIT DESCRIPTION

Connector Connecting the Band Unit and Control Unit

- **Outline**

The pin assignments of the connector that connects the control unit and band unit are common in three bands. The band unit is also used to check which band unit is connected.

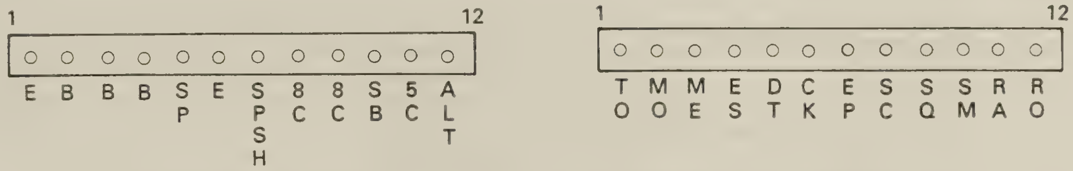


Fig. 30 Connector Connecting the Band Unit and Control Unit

Pin No.	Name	Function	Pin No.	Name	Function
1	E	GND	1	TO	67.0 to 250.3 Hz subtone output
2	B	13.8 V input	2	MO	Audio signal from microphone (including DTMF)
3	B		3	ME	Microphone ground
4	B		4	ES	Shift-register enable output
5	SP	AF signal is output when speaker jack is connected.	5	CK	Shift-register PLL clock
6	E	GND	6	DT	Shift-register PLL data
7	SPSW	Speaker jack connection and detection. "H" during connection.	7	EP	PLL enable
8	8C	8 V is output during the power-on sequence.	8	SC	"L" when squelch input is busy.
9	8C		9	SQ	50 k ohms when squelch D/A output is tight.
10	SB	13.8 V is output during the power-on sequence.	10	SM	Signal-strength meter voltage input
11	SC	5 V is output during the power-on sequence.	11	RA	Detection input (squelch circuit)
12	ACT	ALT voltage input	12	RD	Detection input (no squelch circuit)

Table 8 Pin functions (as viewed from the control unit)

- **Band retrieval**

Each band is retrieved through the EP, CK, and DT pins. Data is input for retrieval when the power is switched on and when the memory is cleared. Data is then output again.

The control unit is pulled down as shown in Figure 31. Therefore, the DT, CK, and EP pins are set low when no band unit is connected. Pins set high as listed in Table 14 are pulled up when any band unit is connected. The type of connected band unit is then judged.

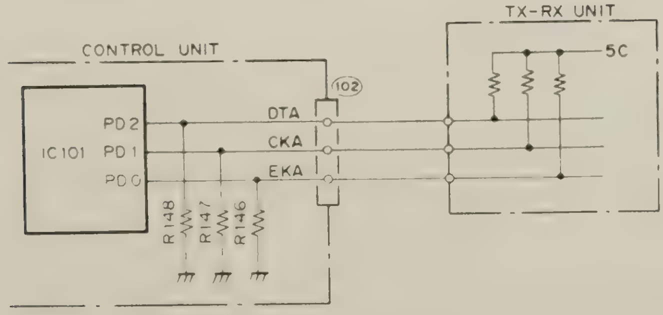


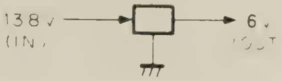
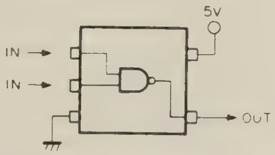
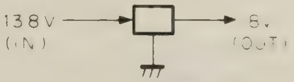
Fig. 31 Retrieval System

BAND Unit	DT	CK	EP
No Unit	L	L	L
144	L	H	H
430	H	L	H
1200	L	L	H

Table 9 Band Retrieval

DESCRIPTION OF COMPONENTS

Control Unit (X53-3310-XX)

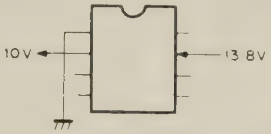
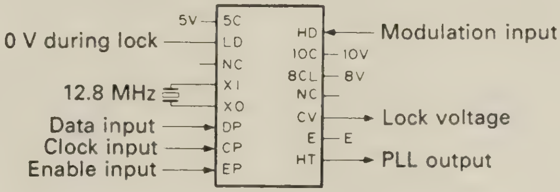
Reference No.	Function	Description
IC1	Microcomputer	See the circuit description.
IC2	SRAM memory backup	
IC3	6V AVR	Three-terminal regulator 
IC4, IC5	Electronic volume control	IC4 R-CH band A volume control IC4 L-CH band B volume control IC5 R-CH band C volume control IC5 L-CH BZ common volume control (Used in common) ③ L-CH input ⑥ L-CH output ⑪ R-CH output ⑭ R-CH input
IC6, IC7	Shift register	See the circuit description.
iC8, IC9	Analog switch	CTCSS, DTSS, or microphone RD band selection (See the circuit description.)
IC10	Low-frequency amplification and adder	Microphone amplifier and DTMF modulation adder
IC11, IC12	Serial data inverter buffer	
IC101	I/O expander	See the circuit description.
IC102	8V AVR	Three-terminal regulator 
IC103	Adder	Used for internal speaker and level compensation.
IC104, IC105	Low-frequency amplification	① Input (IC104: Band B, IC105: Common) ⑥ Output (IC104: Band B, IC105: Common) ⑦ 13.8 V ④ ⑩ ⑫ Ground ⑧ Output (IC104: Band C, IC105: Band A) ⑬ Input (IC104: Band C, IC105: Band A)
IC106	Speaker selection analog switch	④ Band C AF input ⑭ Band A AF input ⑮ Band B AF input ② Band B internal SP output ⑤ Band C internal SP output ⑫ Band A internal SP output ① Band B external SP output ③ Band C external SP output ⑬ Band A external SP output ⑪ Band A selection input ⑩ Band B selection input ⑨ Band C selection input ⑨ to ⑪ Internal SP when "L"
IC107~IC110	Analog switch	Used for squelch. (See the circuit description.)

DESCRIPTION OF COMPONENTS

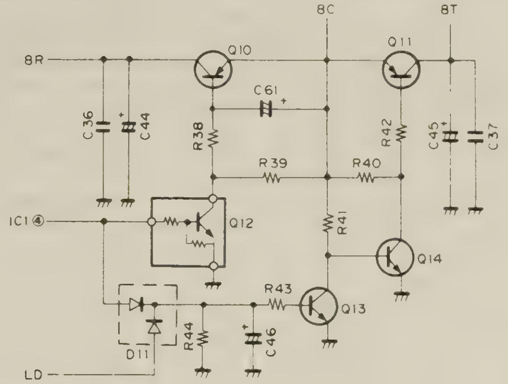
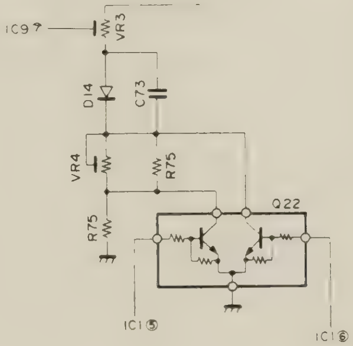
Reference No.	Function	Description
Q1	Low-frequency amplification	Microphone amplifier
Q2	Buffer amplification	Used for microphone RD.
Q3	Microphone line muting	Microphone muting when power is ON (DTMF signal transmission).
Q4	RESET switch	RESET switch for IC1
Q5	BACKUP switch	ON when power is supplied
Q6, Q7, Q8	Low-frequency amplification	Q6 Band A Q7 Band B Q8 Band C
Q9, Q10, Q11	Beep sound muting	Q9 Band A Q10 Band B Q11 Band C A beep sounds from the corresponding band when OFF.
Q13, Q14, Q15	AF muting	Q13 Band A Q14 Band B Q15 Band C Muted when power is on (squelch ON, CTCSS, DTSS, etc.)
Q16	5 V POWER switch	5 V is output when power is ON.
Q17	Low-frequency amplification	Used for DTMF signal monitor.
Q101, Q102	SB POWER switch	Q101 and Q102 are set ON when power is ON. Q101 and Q102 are set OFF when power is OFF.
Q103	Fan motor switch	Rotates when power is ON. Does not rotate when power is OFF.
Q104, Q105	Squelch switch	Same as for IC107 through IC110. (See the circuit description.)
Q106, Q108	MUTE switch	Power amplifier muting Q106 is instantaneously set ON when power is switched ON. Q108 is instantaneously set ON when power is switched OFF.
Q107	RESET switch	RESET switch for IC101
D1	Antireverse current lithium cell selection	Lithium cell is OFF when power is supplied.
D2	Voltage compensation	
D3	Backup detection	
D4	Antireverse current	
D5	Reset detection	
D6, D101 ~ D103	Antireverse current	

DESCRIPTION OF COMPONENTS

144TX-RX Unit (X57-3580-XX)

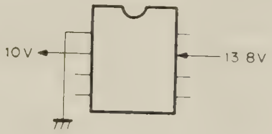
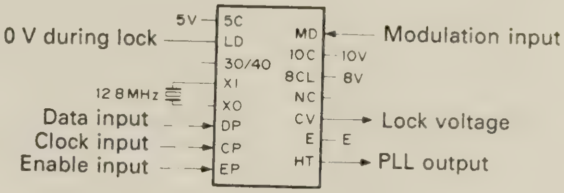
Reference No.	Function	Description
IC1	Shift register	See the circuit description.
IC2	10V AVR	
IC5	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, and squelch switching	① 10.7 MHz first IF input ③, ④ 10.245 MHz second local oscillation ⑨ 0 V when scan control and busy signals are busy. ⑩ Noise detection voltage output (DC) ⑪ Signal-strength meter output ⑫ Detection output ⑭ RD output ⑮ AF output
IC7	Low-frequency amplification and limiter	Microphone amplifier
IC8	144 MHz band transmission driver	Operation during transmission. 144 to 148 MHz band ⑭ Input ① Output
IC9	APC	
IC10	Power module	
IC11	VCO.PLL	 5V 5C 0 V during lock LD NC 12.8 MHz XI XO Data input DP Clock input CP Enable input EP HD Modulation input 10C 10V 8CL 8V NC CV Lock voltage E E HT PLL output
Q1	High-frequency amplification	Operation during reception. 144 MHz band
Q2	First mixer	Operation during reception
Q3	First IF amplification	Operation during reception. 10.7 MHz

DESCRIPTION OF COMPONENTS

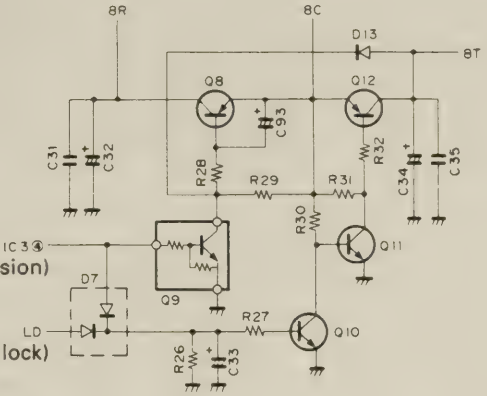
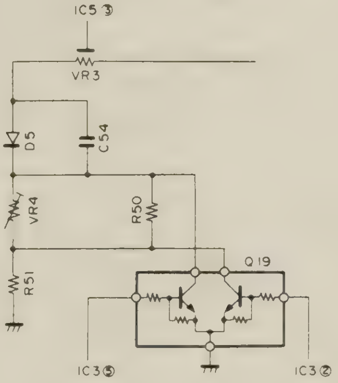
Reference No.	Function	Description
Q10 ~ Q14	Transmission and reception power selection	 8C 8T 8R Q10 Q11 C61 C36 C44 R38 R42 C45 C37 R39 R40 IC1 ④ Q12 R41 Q14 R43 Q13 R44 C46 D11 LD (0 V during lock) (Q10, Q12, and Q13 are set "OFF" during transmission. Q11 and Q14 are set "ON" during transmission.) (Q10, Q12, and Q13 are set "ON" during reception. Q11 and Q14 are set "OFF" during reception.)
Q15, Q16, Q17	Inverter	
Q18	Modulation muting	ON during reception
Q19	CV line buffer	144 MHz band
Q20	PLL output amplification	 IC9 ⑦ VR3 D14 C73 VR4 R75 R75 Q22 IC1 ⑤ IC1 ⑥
Q21	PLL 8 V ripple filter	
Q22	Middle/low POWER switch	Middle and low POWER switches are set ON when high.
Q23	APC control	Operation during transmission
Q24	Squelch hysteresis switch	OFF when busy
D1 ~ D7	Varicap diode tuning	
D11	Antireverse current	
D12	Antireverse current	
D13	PLL output switch	
D14	Temperature compensation	APC
D15, D16	Antenna transmission and reception selection	ON during transmission. OFF during reception.
D17, D18	Power detection	APC
D19	Power reverse connection protection	

DESCRIPTION OF COMPONENTS

430TX-RX Unit (X57-3590-XX)

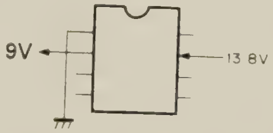
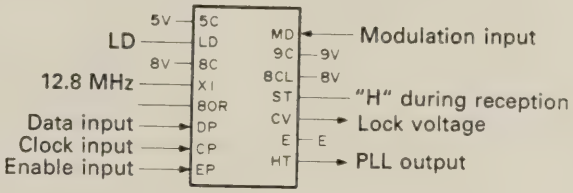
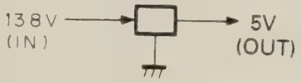
Reference No.	Function	Description
IC1	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, and squelch switching	① 21.6 MHz first IF input ③, ④ 21.145 MHz second local oscillation ⑨ 0 V when scan control and busy signals are busy. ⑩ Noise detection voltage output (DC) ⑪ Signal-strength meter output ⑫ Detection output ⑭ RD output ⑮ AF output
IC2	Low-frequency amplification and limiter	Microphone amplifier
IC3	Shift register	See the circuit description.
IC4	10V AVR	
IC5	APC	
IC6	430 MHz band transmission driver	① Output ⑮ Input
IC7	Power module	
IC10	VCO.PLL	 5V 5C 0 V during lock LD 30/40 XI 12.8MHz XO Data input DP Clock input CP Enable input EP MD Modulation input 10C 10V 8CL 8V NC CV Lock voltage E E HT PLL output
Q1, Q2	High-frequency amplification	Operation during reception
Q3	First mixer	Operation during reception
Q5	First IF amplification	Operation during reception. 21.6 MHz

DESCRIPTION OF COMPONENTS

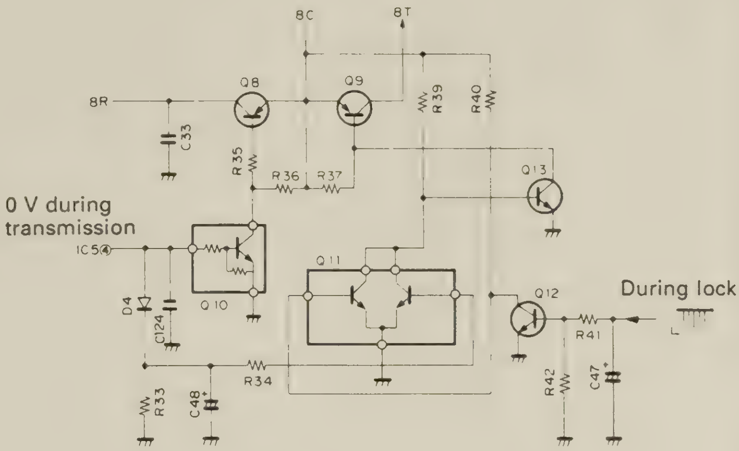
Reference No.	Function	Description
Q8~Q12	Transmission/reception power selection	 8R 8C D13 8T Q8 Q12 C93 C31 C32 R28 R29 R31 R32 C34 C35 R30 IC3④ Q11 D7 Q9 R27 LD Q10 R26 C33 (0V during transmission) (0 V during lock) (Q8, Q9, and Q10 are set "OFF" during transmission. Q11 and Q12 are set "ON" during transmission.) (Q8, Q9, and Q10 are set "ON" during reception. Q11 and Q12 are set "OFF" during reception.)
Q13, Q14, Q15	Inverter	
Q16	Modulation muting	ON during reception
Q17	PLL 8 V ripple filter	
Q18	PLL output amplification	
Q19	Middle/low POWER switch	Middle and low POWER switches are ON when high.  IC5 ③ VR3 D5 C54 VR4 R50 Q19 R51 IC3⑤ IC3②
Q20	APC control	Operation during transmission
Q21	Squelch hysteresis switch	OFF when busy
D1	Antenna switch	OFF during reception
D4	PLL output switch	
D5	Temperature compensation	APC
D6, D7	Antireverse current	
D8, D9	Antenna transmission/reception selection	ON during transmission
D10,D11	Power detection	APC
D12	Power reverse connection protection	
D13	Antireverse current	8T pulse rise is faster during transmission and reception.
D14	IF level limiter	

DESCRIPTION OF COMPONENTS

1200TX-RX Unit (X57-3600-11)

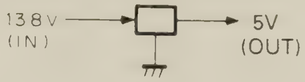
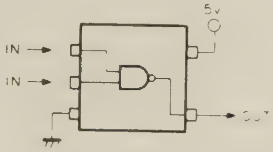
Reference No.	Function	Description
IC2	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, and squelch switching	① 59.7 MHz first IF input ③, ④ 59.245 MHz second local oscillation ⑨ 0 V when scan control and busy signals are busy. ⑩ Noise detection voltage output (DC) ⑪ Signal-strength meter output ⑫ Detection output ⑭ RD output ⑮ AF output
IC3	ALT	② 8 V ③ "H" during ALT ⑩ Detection input (DC)
IC4	Low-frequency amplification and limiter	Microphone amplifier
IC5	Shift register	See the circuit description.
IC6	9V AVR	
IC7	Predrive	⑩ Input ① Output
IC8	Drive	① Output ⑧ Input
IC9	APC	
IC10	Power module	
IC11	VCO.PLL	 5V 5C LD LD 8V 8C 12.8 MHz XI 8OR Data input DP Clock input CP Enable input EP MD Modulation input 9C 9V 8CL 8V ST "H" during reception CV Lock voltage E E HT PLL output
IC12	5V AVR	Three-terminal regulator 
Q1, Q2	High-frequency amplification	Operation during reception
Q3	First mixer	Operation during reception
Q6	Receiving PLL output amplification	Operation during reception
Q7	First IF amplification	Operation during reception. 59.7 MHz

DESCRIPTION OF COMPONENTS

Reference No.	Function	Description
Q8 ~ Q13	Transmission/reception power selection	 8C 8T Q8 Q9 8R R39 R40 C33 R35 R36 R37 Q13 0 V during transmission IC5④ Q11 Q10 D4 C124 Q12 During lock R41 R34 R33 C48 R42 C47 Q8, Q10, and Q11 (b) are set "OFF" during transmission. Q9, Q12, and Q13 are set "ON" during transmission. Q8, Q10, Q11 (b), and Q12 are set "ON" during reception. Q9, Q11 (a), and Q13 are set "OFF" during reception.
Q15, Q16, Q17	Inverter	
Q18	Modulation muting	ON during reception
Q19, Q20	8T voltage selection	OFF when low
Q21	PLL output amplification	
Q22	Transmitting PLL output amplification	Operation during transmission
Q23	8 V ripple filter	
Q24	APC control	Operation during transmission
Q25	Lower-power switch	ON when high
Q26	Squelch hysteresis switch	OFF when busy
Q28	Q1 POWER switch	ON during transmission
D3	IF level limiter	
D4, D17	Antireverse current	
D5, D15	Constant voltage circuit	
D6	Temperature compensation	APC
D7	Temperature compensation	Drive
D8	Overvoltage prevention	
D9	Power detection	APC
D10 ~ D13	Antenna switch	ON during transmission
D14	Power reverse connection protection	

DESCRIPTION OF COMPONENTS

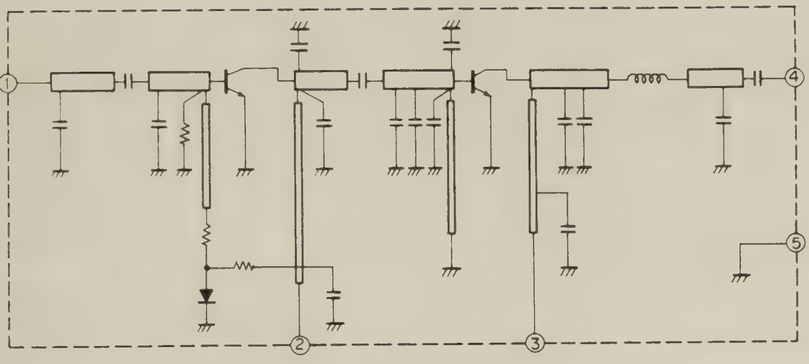
LCD ASSY (B38-034X-05)

Reference No.	Function	Description
IC1	Microcomputer	See the circuit description.
IC2, IC3	LCD driver	
IC4	5V AVR	Three-terminal regulator 
IC5, IC6	Serial data inverter buffer	Same as IC11 and IC12 (X53-3310-XX) 
IC7	Reset IC	
Q1	RESET switch	
Q2	Lamp AVR error amplification	
Q3	Lamp AVR switch	
Q4	Lamp AVR	
Q5	5 V POWER switch	ON when power is on. OFF when APO is off.
Q6 ~ Q11	Control band LED switch	Q6, Q9, and Q11 are set "ON" when A. Q7, Q8, and Q10 are set "OFF" when A. Q7, Q8, and Q11 are set "ON" when B. Q6, Q9, and Q10 are set "OFF" when B. Q7, Q9, and Q10 are set "ON" when C. Q6, Q8, and C11 are set "OFF" when C.
Q12	Function LED switch	ON during function

SEMICONDUCTOR DATA

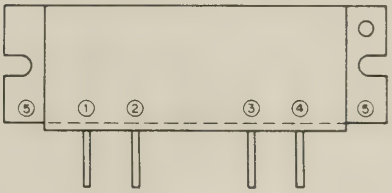
Power module S-AV17 (144 TX-RX UNIT)

- **Equivalent circuit diagram**



- **External view**

① Input terminal
② First power supply terminal
③ End power supply terminal
④ Output terminal
⑤ Fin (earth)

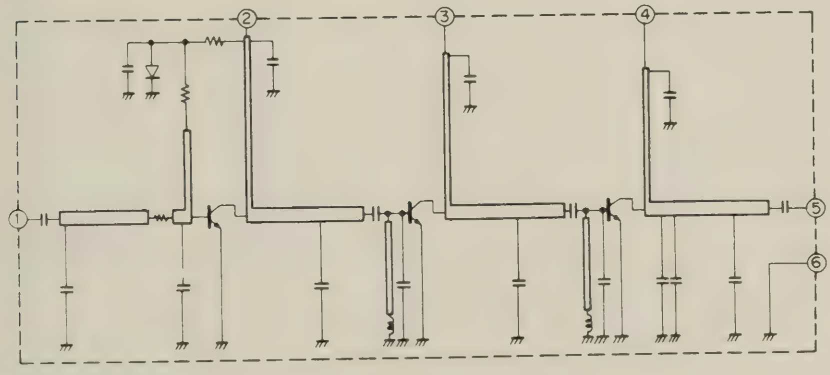


- **Electrical characteristics**

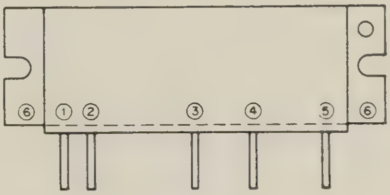
Item	Symbol	Tc (°C)	Conditions	Standard value			Unit
				Minimum	Standard	Maximum	
Frequency	f			144		148	MHz
Output power	Po	25	Vcc = 12.5V, Pin = 400mW, Zg = Zl = 50Ω			65	W
Combined effeciency	ηT	25	Same as above	45			%
Harmonics	HRM	25	Same as above		–30	–25	dB

Power module M57788M (430 TX-RX UNIT)

- **Equivalent circuit diagram**



- **External view**



① Input terminal
② First power supply terminal
③ Driver power supply terminal
④ End power supply terminal
⑤ Output terminal
⑥ Fin (earth)

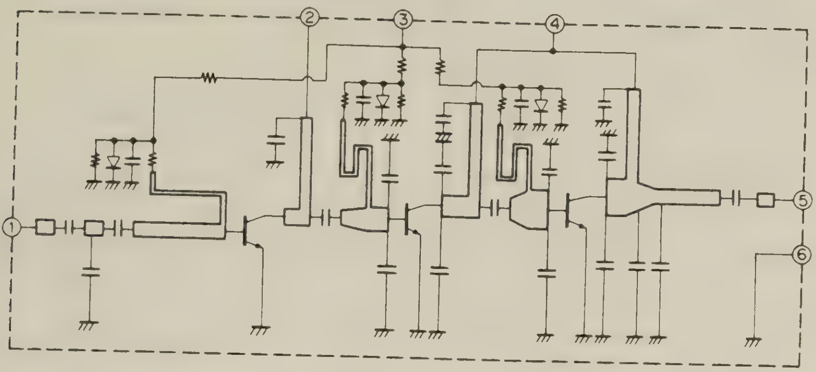
- **Electrical characteristics**

Item	Symbol	Tc (°C)	Conditions	Standard value			Unit
				Minimum	Standard	Maximum	
Frequency	f			430		450	MHz
Output power	Po	25	Vcc = 12.5V, Pin = 400mW, Zg = Zl = 50Ω	40	45		W
Combined effeciency	ηT	25	Same as above	40	45		%
Secondary spurious strength		25	Same as above			–30	dB
Tertiary spurious strength		25	Same as above			–30	dB

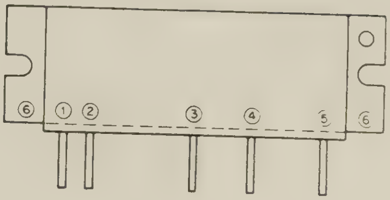
SEMICONDUCTOR DATA

Power module M67711 (1200 TX-RX UNIT)

- **Equivalent circuit diagram**



- **External view**



① Input terminal
② First power supply terminal
③ Bias power supply terminal
④ End power supply terminal
⑤ Output terminal
⑥ Fin (earth)

- **Electrical characteristics**

Item	Symbol	Tc (°C)	Conditions	Standard value			Unit
				Minimum	Standard	Maximum	
Frequency	f			1.24		1.3	GHz
Output power	Po	25	Vcc = 12.5V, Vbb = 10V, Pin = 1W, Zg = Zl = 50Ω	16	17		W
Combined effeciency	ηT	25	Same as above	30	35		%
Secondary spurious strength		25	Same as above			–45	dB

TM-941A

PARTS LIST

CAPACITORS CC 45 TH 1H 220 J
1 2 3 4 5 6

1 = Type ...... ceramic, electrolytic, etc.
2 = Shape ......round, square, etc.
3 = Temp. coefficient
4 = Voltage rating
5 = Value
6 = Tolerance

- Capacitor value

0 1 0 = 1pF
1 0 0 = 10pF
1 0 1 = 100pF
1 0 2 = 1000pF = 0.001µF
1 0 3 = 0.01µF

2 2 0 = 22pF
1st number | Multiplier
2nd number

- Temperature Coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	−80	−150	−220	−330	−470	−750

2nd Word	G	H	J	K	L
ppm/°C	± 30	± 60	± 120	± 250	± 500

Example CC45TH = −470 ± 60 ppm/°C

- Tolerance

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	± 0.25	± 0.5	± 2	± 5	± 10	± 20	+ 40 −20	+ 80 −20	+ 100 −0	More than 10µF −10~ + 50 Less than 4.7µF −10~ + 75

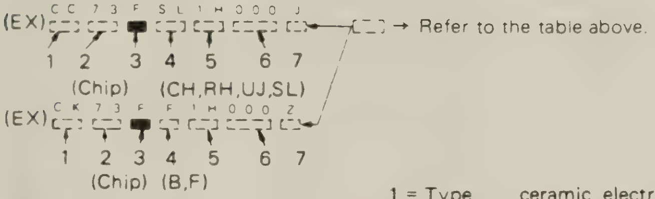
Code	B	C	D	F	G
(pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

Less than 10 pF

- Rating voltage

2nd word / 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	–
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	–
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	–

- Chip capacitors


(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH,RH,UJ,SL)
→ Refer to the table above.
(EX) C K 7 3 F F 1 H 0 0 0 Z
1 2 3 4 5 6 7
(Chip) (B,F)

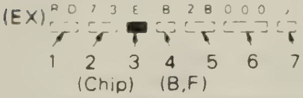
Dimension

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25

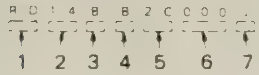
1 = Type ...... ceramic, electrolytic, etc.
2 = Shape ...... round, square, etc.
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance.

RESISTORS

- Chip resistor (Carbon)



- Carbon resistor (Normal type)



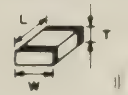
Dimension

Dimension code	L	W	T	Wattage
E	3.2 ± 0.2	1.6 ± 0.2	0.57	2B
F	2.0 ± 0.3	1.25 ± 0.2	0.45	2A

Rating wattage

Cord	Wattage	Cord	Wattage	Cord	Wattage
2A	1/10W	2E	1/4W	3A	1W
2B	1/8W	2H	1/2W	3D	2W
2C	1/6W				

Dimension



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				TM-941A			
1	1C	*	A01-2006-03	METALLIC CABINET(UPSIDE)			
2	4B	*	A01-2007-03	METALLIC CABINET(BOTTOM)			
3	4B	*	A62-0021-03	PANEL ASSY			
4	3B	*	A82-0001-02	BACK PANEL			
5	4A	*	B03-0562-04	DRESSING PLATE			
-		*	B11-0487-08	FILTER			
-		*	B11-0488-08	FILTER			
-		*	B11-0500-08	FILTER			
10	3A	*	B11-1002-04	FILTER			
11	4B	*	B38-0341-05	LCD ASSY		K,P	
11	4B	*	B38-0342-05	LCD ASSY		M	
12	3A	*	B38-0345-08	LCD			
13	4B		B41-0679-04	LABEL	(FCC)		
14	1B		B42-2455-04	LABEL			
15	2C		B42-3343-04	LABEL	(S/NO)		
15-1	1C		B42-3394-04	LABEL	(FCC)	K,P	
16	1C	*	B42-3412-04	LABEL	(SP,ANT)	M	
16	1C	*	B42-3440-04	LABEL	(SP,ANT)	K,P	
17	1E		B46-0410-20	WARRANTY CARD		K	
17	1E		B46-0422-00	WARRANTY CARD		P	
20	1D	*	B62-0010-00	INSTRUCTION MANUAL			
21	2C	*	B72-0021-04	MODEL NAME PLATE		K,P	
21	2C	*	B72-0022-04	MODEL NAME PLATE		M	
23	2A	*	B58-1001-00	CAUTION CARD			
24	4B	*	D10-0607-04	LEVER			
25	4B	*	D32-0415-04	STOPPER			
26	2B	*	E23-0657-04	TERMINAL			
27	-	*	E29-0488-08	CONNECTOR			
28	-	*	E30-3005-05	CONNECTING WIRE(COMON-PANEL)			
-			E30-3006-08	CURL CORD			
30	2D	*	E30-3034-05	DC CORD	(ACSY)		
31	2A	*	E37-0006-05	CONNECTING WIRE(SP)			
32	2A	*	E37-0007-05	FLAT CABLE	(COMON)		
33	3D		F05-1531-05	FUSE (ACSY)			
35	2C		F05-2036-05	FUSE	(20A)		
37	2C	*	F07-1203-03	COVER	(FAN)		
38	3B	*	F07-1204-04	COVER	(PANEL)		
39	4B	*	G01-0854-04	COMPRESSION SPRING			
40	4A		G02-0505-05	LEAF SPRING			
41	2A	*	G02-0701-04	FLAT SPRING	(SP)		
42	4A		G09-0405-05	SPRING			
43	2B		G10-0635-04	NON-WOVEN FABRIC(19X9)			
44	2A	*	G10-0700-04	NON-WOVEN FABRIC(60X10)			
45	1C		G10-0663-04	NON-WOVEN FABRIC			
-	-		G10-0668-04	NON-WOVEN FABRIC			
47	4C		G10-0684-04	NON-WOVEN FABRIC(130X10)			
-	-	*	G10-0694-04	NON-WOVEN FABRIC			
49	3B	*	G11-0651-04	CUSHION			
50	3B	*	G11-0652-03	CUSHION			
51	3B	*	G11-0653-04	CUSHION			
52	3A	*	G13-0967-04	CUSHION (3KEY)			
53	4A	*	G13-0968-04	CUSHION (8KEY)			

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54	4A	*	G13-0969-04	CUSHION (3KEY)		
55	2A	*	G13-1302-04	CUSHION (COMMON)		
56	3A	*	G11-0658-04	CUSHION (15X10)		
57	4C		G53-0508-04	NON-WOVEN FABRIC(30X10)		
58	1A		G53-0511-04	NON-WOVEN FABRIC (COMMON)		
59	3D	*	H10-2696-02	POLYSTYREN FOAMED FIXTURE		
60	1D		H11-0830-04	PACKING FIXTURE		
61	2E		H25-0723-04	PROTECTION BAG (230X400)		
62	2D		H25-0079-04	PROTECTION BAG (200X200)		
63	3E	*	H52-0015-04	ITEM CARTON BOX	K,P	
63	3E	*	H52-0016-04	ITEM CARTON BOX	M	
64	2D		H25-0029-04	PROTECTION BAG(MIC FOOK SCREW)		
65	2D		J20-0319-24	MIC HOOK (ASCY)	K,P	
66	4A	*	J19-1477-04	HOLDER (LED)		
67	2C	*	J21-4308-04	MOUNTING HARDWARE (FAN)		
68	3B	*	J21-4309-14	MOUNTING HARDWARE (LEVER)		
-	-	*	J21-4311-08	MOUNTING HARDWARE		
70	2E	*	J29-0454-03	BRACKET (ACSY)		
71	3B	*	J42-0470-03	BUSHING (MIC)		
72	4C	*	J42-0473-04	BUSHING (NUT)		
73	4A	*	K27-3078-04	KNOB(BUTTON) VFO		
74	4A	*	K27-3079-04	KNOB(BUTTON) MR		
75	4A	*	K27-3080-04	KNOB(BUTTON) MHZ		
76	4A	*	K27-3081-04	KNOB(BUTTON) CALL		
77	4A	*	K27-3082-04	KNOB(BUTTON) F		
78	4A	*	K27-3089-04	KNOB(BUTTON) SHIFT		
79	4A	*	K27-3084-04	KNOB(BUTTON) TONE		
80	4A	*	K27-3085-04	KNOB(BUTTON) REV		
81	4A	*	K27-3086-04	KNOB(BUTTON) DTSS		
82	4A	*	K27-3087-04	KNOB(BUTTON) LOW		
83	4A	*	K27-3088-04	KNOB(BUTTON) MUTE		
84	4B	*	K27-3090-04	KNOB(BUTTON)		
85	4A	*	K27-3091-04	KNOB(BUTTON) POWER		
86	4A	*	K27-3092-04	KNOB(BUTTON) RELEASE		
87	4A		K29-3156-04	KNOB		
88	4A	*	K29-4575-04	KNOB VOL		
89	4A	*	K29-4576-04	KNOB SQL		
-	-	*	L15-0022-05	COIL		
A	3B		N09-2036-05	SCREW RELEASE		
B	2B		N09-2084-05	MACHINE SCREW (+ TERMINAL)		
C	3B	*	N09-2130-05	SCREW PANEL		
D	4C		N10-2030-46	HEXAGON NUT (BAND UNIT CONNEC		
E	2B	*	N30-3040-46	MACHINE SCREW(UNIT)		
F	1B,1C		N33-2606-45	MACHINE SCREW(CASE,FAN)		
G	1C	*	N33-2614-45	MACHINE SCREW(FAN)		
H	2D		N46-3010-46	TAPPING SCREW(MIC HOOK)		
I	4B,4C		N86-2606-45	SCREW		
J	1A,3C		N87-2606-46	TAPTITE SCREW(COMMON UNIT)		
K	1A		N87-2608-46	TAPTITE SCREW(HEAT SINK)		
L	1B,2A		N88-2606-46	FLAT HEAD TAPTITE SCREW(TX-RX)		
M	3D		N99-0331-05	SCREW SET(ACSY)		
SP1	2A	*	T07-0268-05	SPEAKER		
MFAN	2C	*	T42-0307-15	DC MOTOR ASSY (FAN)		

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92	1D	*	T91-0396-05	MICROPHONE (ACSY)	M	
92	1D	*	T91-0397-05	MICROPHONE (ACSY)	K,P	
95	2D		W01-0414-04	SPANNER (ACSY)		
97	2B,3B	*	X53-3310-11	CONTROL UNIT		
99	2B	*	X57-3580-11	TX-RX UNIT (144 50W)	K	
99	2B	*	X57-3580-21	TX-RX UNIT (144 50W)	M,P	
102	3C	*	X57-3590-11	TX-RX UNIT (440 35W)	K,P	
102	3C	*	X57-3590-21	TX-RX UNIT (440 35W)	M	
105	4C	*	X57-3600-11	TX-RX UNIT (1200 10W)		
CONTROL UNIT (X53-3310-11)						
C1 -4			CK73FB1H102K	CHIP C 1000PF K		
C5			CK73FB1E104K	CHIP C 0.10UF K		
C6		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C7			CK73FB1E223K	CHIP C 0.022UF K		
C8			CK73FB1H102K	CHIP C 1000PF K		
C9			CK73FB1E104K	CHIP C 0.10UF K		
C10			CK73FB1H102K	CHIP C 1000PF K		
C11		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C12			CK73FB1H102K	CHIP C 1000PF K		
C13			CK73FB1E223K	CHIP C 0.022UF K		
C14			CK73FB1H102K	CHIP C 1000PF K		
C15 ,16			CC73FCH1H330J	CHIP C 33PF J		
C17 -19			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		
C20 -28			CK73FB1E104K	CHIP C 0.10UF K		
C29		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C30			CK73FB1E104K	CHIP C 0.10UF K		
C31			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C32 -35			CK73FB1H102K	CHIP C 1000PF K		
C36 ,37			CC73FSL1H101J	CHIP C 100PF J		
C38 -40			CK73FB1H102K	CHIP C 1000PF K		
C41			CE04EW1A101M	ELECTRO 100UF 10WV		
C42		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C43			CK73FB1H102K	CHIP C 1000PF K		
C44			CK73FB1E103K	CHIP C 0.01UF K		
C45 ,46			CK73FB1H102K	CHIP C 1000PF K		
C47 -49			CK73FB1E104K	CHIP C 0.10UF K		
C50		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C51			CC73FSL1H101J	CHIP C 100PF J		
C101-103			CK73FB1H102K	CHIP C 1000PF K		
C104			CE04EW1C470M	ELECTRO 47UF 16WV		
C105			CK73FB1H102K	CHIP C 1000PF K		
C106			CE04EW1A470M	ELECTRO 47UF 10WV		
C107,108			CK73FB1E123K	CHIP C 0.012UF K		
C109			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C110			CK73FB1H682K	CHIP C 6800PF K		
C111		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C112-115			CK73FB1E104K	CHIP C 0.10UF K		
C116			CE04EW1A471M	ELECTRO 470UF 10WV		
C117-120			CE04EW1A470M	ELECTRO 47UF 10WV		
C121			CE04EW1C101M	ELECTRO 100UF 16WV		
C122-125			CE04EW1A470M	ELECTRO 47UF 10WV		
C126			CE04EW1C101M	ELECTRO 100UF 16WV		
C127-129			CK73FB1E104K	CHIP C 0.10UF K		

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CONTROL UNIT (X53-3310-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
C130,131			CK73FB1H102K	CHIP C 1000PF K		
C132			CE04EW1C101M	ELECTRO 100UF 16WV		
C133-135			CE04EW1A471M	ELECTRO 470UF 10WV		
C136			CK73FB1H102K	CHIP C 1000PF K		
C137			CK73FB1E123K	CHIP C 0.012UF K		
C138			CE04EW1C470M	ELECTRO 47UF 16WV		
C139			CK73FB1E223K	CHIP C 0.022UF K		
C140,141			CK73FB1E103K	CHIP C 0.01UF K		
C142,143			CK73FB1H102K	CHIP C 1000PF K		
C144			CC73FSL1H101J	CHIP C 100PF J		
C145,146		*	CK73FF1C105Z	CHIP C 1.0UF Z		
CN1 ,2		*	E40-5417-05	PIN ASSY 13P		
CN3			E40-3246-05	PIN CONNECTOR 2P(SP)		
CN4			E40-3248-05	PIN ASSY 4P(PANEL)		
CN5			E40-5188-05	PIN ASSY 11P(DTSS)		
CN6			E40-5183-05	PIN ASSY 6P(DTSS)		
CN7			E40-5343-05	PIN ASSY 9P(CTCSS)		
CN8			E40-5224-05	PIN CONNECTOR 16P		
CN101-106		*	E40-5452-05	PIN ASSY 12P		
CN107,108		*	E40-5400-05	PIN ASSY 13P		
CN109			E40-5224-05	PIN CONNECTOR 16P		
CN110			E40-3237-05	PIN CONNECTOR 2P(FAN)		
J1			E11-0425-05	PHONE JACK (3.5D)		
J2		*	E08-0876-05	MODULER JACK (MIC JACK)		
W1			E33-1871-15	FINISHED WIRE SET		
X1			L77-1333-05	CRYSTAL RESONATOR (4.19MHZ)		
			RK73FB2A393J	CHIP R 39K J 1/10W		
R1 -3			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R4 -6			RK73FB2A473J	CHIP R 47K J 1/10W		
R7			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R8			R90-0711-05	MULTI-COMP R		
R9			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R10			RK73FB2A154J	CHIP R 150K J 1/10W		
R11			RK73FB2A333J	CHIP R 33K J 1/10W		
R12			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R13			RK73FB2A392J	CHIP R 3.9K J 1/10W		
R14			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R15			RK73FB2A183J	CHIP R 18K J 1/10W		
R16			RK73FB2A104J	CHIP R 100K J 1/10W		
R17			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R18			RK73FB2A221J	CHIP R 220 J 1/10W		
R19			RK73FB2A563J	CHIP R 56K J 1/10W		
R20 ,21			RK73FB2A473J	CHIP R 47K J 1/10W		
R22			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R23 -28			RK73FB2A153J	CHIP R 15K J 1/10W		
R29			RK73FB2A684J	CHIP R 680K J 1/10W		
R30			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R31			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R32			RK73FB2A684J	CHIP R 680K J 1/10W		
R33			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R34			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R35			RK73FB2A684J	CHIP R 680K J 1/10W		
R36			RK73FB2A272J	CHIP R 2.7K J 1/10W		

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CONTROL UNIT (X53-3310-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
R37			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R38 -40			RK73FB2A104J	CHIP R 100K J 1/10W		
R41			RK73FB2A103J	CHIP R 10K J 1/10W		
R42			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R43			RK73FB2A123J	CHIP R 12K J 1/10W		
R44 -47			RK73FB2A103J	CHIP R 10K J 1/10W		
R48			RK73FB2A683J	CHIP R 68K J 1/10W		
R49			RK73FB2A473J	CHIP R 47K J 1/10W		
R50			RK73FB2A474J	CHIP R 470K J 1/10W		
R51			RK73FB2A124J	CHIP R 120K J 1/10W		
R52			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R53			RK73FB2A224J	CHIP R 220K J 1/10W		
R54			RK73FB2A184J	CHIP R 180K J 1/10W		
R55			RK73FB2A474J	CHIP R 470K J 1/10W		
R56			R92-0670-05	CHIP R 0 OHM		
R57			RK73FB2A223J	CHIP R 22K J 1/10W		
R58			R92-0670-05	CHIP R 0 OHM		
R60			R92-0670-05	CHIP R 0 OHM		
R61 -63			RK73FB2A474J	CHIP R 470K J 1/10W		
R64 -67			RK73FB2A473J	CHIP R 47K J 1/10W		
R68			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R69			RK73FB2A103J	CHIP R 10K J 1/10W		
R70			RK73FB2A473J	CHIP R 47K J 1/10W		
R71			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R72			RK73FB2A822J	CHIP R 8.2K J 1/10W		
R73			RK73FB2A153J	CHIP R 15K J 1/10W		
R74			RK73FB2A473J	CHIP R 47K J 1/10W		
R75 ,76			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R77			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R78			RK73FB2A471J	CHIP R 470 J 1/10W		
R79			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R101			RK73FB2A273J	CHIP R 27K J 1/10W		
R102			RK73FB2A123J	CHIP R 12K J 1/10W		
R103			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R104			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R105			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R106			RK73FB2A561J	CHIP R 560 J 1/10W		
R107			RK73FB2A273J	CHIP R 27K J 1/10W		
R108			RK73FB2A123J	CHIP R 12K J 1/10W		
R109			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R110			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R111			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R112			RK73FB2A561J	CHIP R 560 J 1/10W		
R113			RK73FB2A273J	CHIP R 27K J 1/10W		
R114			RK73FB2A123J	CHIP R 12K J 1/10W		
R115			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R116			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R117			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R118			RK73FB2A561J	CHIP R 560 J 1/10W		
R119			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R120			RK73FB2A103J	CHIP R 10K J 1/10W		
R121			R92-1215-05	CHIP R 470 J 1/2W		
R122-124			RK73FB2A473J	CHIP R 47K J 1/10W		
R125-127			RK73FB2A474J	CHIP R 470K J 1/10W		
R128,129			RK73FB2A104J	CHIP R 100K J 1/10W		

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R130-133			RK73FB2A183J	CHIP R 18K J 1/10W		
R134			RK73FB2A4R7J	CHIP R 4.7 J 1/10W		
R135			RK73FB2A473J	CHIP R 47K J 1/10W		
R136,137			RK73FB2A101J	CHIP R 100 J 1/10W		
R138,139			RK73FB2A473J	CHIP R 47K J 1/10W		
R140,141			RK73FB2A101J	CHIP R 100 J 1/10W		
R142			RK73FB2A473J	CHIP R 47K J 1/10W		
R143-145			RK73FB2A4R7J	CHIP R 4.7 J 1/10W		
R146			RK73FB2A474J	CHIP R 470K J 1/10W		
R147,148			RK73FB2A183J	CHIP R 18K J 1/10W		
R149			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R150			RK73FB2A474J	CHIP R 470K J 1/10W		
R151,152			RK73FB2A183J	CHIP R 18K J 1/10W		
R153			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R154-156			RK73FB2A474J	CHIP R 470K J 1/10W		
R157			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R158,159			RK73FB2A473J	CHIP R 47K J 1/10W		
R160			R92-0685-05	CHIP R 22 J 1/2W		
R161			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R162-169			RK73FB2A473J	CHIP R 47K J 1/10W		
R170			RK73FB2A563J	CHIP R 56K J 1/10W		
R171			RK73FB2A103J	CHIP R 10K J 1/10W		
R172			RK73FB2A473J	CHIP R 47K J 1/10W		
R173,174			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R175-177			RK73FB2A102J	CHIP R 1.0K J 1/10W		
D1			1SS184	DIODE		
D2		*	LFB01	DIODE		
D3			02CZ7.5(X)	DIODE		
D4		*	LFB01	DIODE		
D5			02CZ3.0(Z)	DIODE		
D6		*	LFB01	DIODE		
D101-103			1SS184	DIODE		
IC1		*	75516GF-189-3B9	IC(UPD)		
IC2		*	LC3564PML-12,15	IC(64K RAM)		
IC3			TA78L06F	IC(6V AVR)		
IC4 ,5			TC9154AP	IC(2CH ELECTRONIC VOLUME)		
IC6 ,7			BU4094BF	IC		
IC8 ,9			BU4053BF	IC		
IC10		*	NJM4558E	IC		
IC11,12			TC4S11F	IC(2 INPUT NAND GATE)		
IC101			CXD1095Q	IC		
IC102		*	MC78T08CT	IC(8V AVR)		
IC103		*	NJM4558E	IC		
IC104,105			LA4446	IC(AF PA)		
IC106			BU4053BF	IC		
IC107-110			BU4066BF	IC(ANALOG SWITCH X4)		
Q1			2SC3324(G)	TRANSISTOR		
Q2			2SC2712(Y)	TRANSISTOR		
Q3			DTC114EK	DIGITAL TRANSISTOR		
Q4 -8			2SC2712(Y)	TRANSISTOR		
Q9 -11			DTC114EK	DIGITAL TRANSISTOR		
Q12 -15			2SD1757(K)	TRANSISTOR		
Q16			2SA1519	TRANSISTOR		
Q17			2SC2712(Y)	TRANSISTOR		
Q101			2SC2712(Y)	TRANSISTOR		

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CONTROL UNIT (X53-3310-11)
TX-RX UNIT/144 (X53-3580-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
Q102		*	2SA1641(S,T)	TRANSISTOR		
Q103			DTD143EK	DIGITAL TRANSISTOR		
Q104,105			DTC114EK	DIGITAL TRANSISTOR		
Q106			DTC144EK	DIGITAL TRANSISTOR		
Q107			2SC2712(Y)	TRANSISTOR		
Q108			DTA144EK	DIGITAL TRANSISTOR		
BA1		*	W09-0573-05	LITHUM BATTERY		
TX-RX UNIT/144 (X53-3580-XX) -11:K, -21:M, P						
C5			CC73FCH1H040C	CHIP C 4PF C		
C6 -9			CK73FB1H102K	CHIP C 1000PF K		
C10			CK73FB1E103K	CHIP C 0.01UF K		
C11			CC73FCH1H0R5C	CHIP C 0.5PF C		
C12			CC73FCH1H151J	CHIP C 150PF J		
C13			CC73FCH1H030C	CHIP C 3PF C		
C14			CC73FCH1H0R5C	CHIP C 0.5PF C		
C15			CC73FCH1H150J	CHIP C 15PF J		
C16			CC73FCH1H020C	CHIP C 2.0PF C		
C18			CK73FB1H102K	CHIP C 1000PF K		
C19			CC73FCH1H060D	CHIP C 6PF D		
C20			CK73FB1H102K	CHIP C 1000PF K		
C21			CC73FCH1H050C	CHIP C 5PF C		
C22			CK73FB1E103K	CHIP C 0.01UF K		
C23			CK73FB1H102K	CHIP C 1000PF K		
C24			CK73FB1E103K	CHIP C 0.01UF K		
C26			CK73FB1H102K	CHIP C 1000PF K		
C29			CK73FB1E103K	CHIP C 0.01UF K		
C30			CC73FCH1H390J	CHIP C 39PF J		
C31			CC73FCH1H101J	CHIP C 100PF J		
C32			CK73FB1H102K	CHIP C 1000PF K	K	
C33			CK73FB1E104K	CHIP C 0.10UF K		
C34 ,35			CK73EF1C105Z	CHIP C 1.0UF Z		
C36 ,37			CK73FB1E103K	CHIP C 0.01UF K		
C44 ,45			CE04NW1C470M	ELECTRO 47UF 16WV		
C46			C92-0504-05	CHIP-TAN 0.68UF 20WV		
C47			CE04NW1C470M	ELECTRO 47UF 16WV		
C48			C92-0003-05	CHIP-TAN 0.47UF 25WV		
C49			CE04NW1E100M	ELECTRO 10UF 25WV	K	
C50			CE04NW1C470M	ELECTRO 47UF 16WV		
C51 ,52			CK73FB1E103K	CHIP C 0.01UF K		
C53 ,54			CK73FB1H102K	CHIP C 1000PF K		
C55			CK73EF1C105Z	CHIP C 1.0UF Z		
C56			CC73FUJ1H150J	CHIP C 15PF J		
C57			CK73FB1H102K	CHIP C 1000PF K		
C58			CC73FUJ1H220J	CHIP C 22PF J		
C59 ,60			CK73FB1H102K	CHIP C 1000PF K		
C61			CE04NW1C470M	ELECTRO 47UF 16WV		
C62			CK73FB1H102K	CHIP C 1000PF K		
C63			CK73FB1E103K	CHIP C 0.01UF K		
C64			CE04NW1E100M	ELECTRO 10UF 25WV		
C65		*	CE04NW1A330M	ELECTRO 33UF 10WV		
C66			CK73FB1E103K	CHIP C 0.01UF K		
C67			CK73FB1H102K	CHIP C 1000PF K		
C68 ,69			CC73FCH1H100D	CHIP C 10PF D		

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TX-RX UNIT/144 (X53-3580-XX)

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C70			CK73FB1E103K	CHIP C 0.01UF K		
C71 -73			CK73FB1H102K	CHIP C 1000PF K		
C74			CK73FB1H223K	CHIP C 0.022UF K		
C75			CE04NW1C101M	ELECTRO 100UF 16WV		
C76			CK73EF1C105Z	CHIP C 1.0UF Z		
C77 ,78			CK73FB1H102K	CHIP C 1000PF K		
C79			CK73EF1C105Z	CHIP C 1.0UF Z		
C80			CC73FCH1H050C	CHIP C 5PF C		
C81			CC45SL2H120J	CERAMIC 12PF J		
C82			CK73FB1H102K	CHIP C 0.001UF K		
C83			CK45B2H102K	CERAMIC 1000PF K		
C84			CM73F2H330J	CHIP C 33PF J		
C85			CC73FCH1H220J	CHIP C 22PF J		
C86			CC73FCH1H0R5C	CHIP C 0.5PF C		
C87			CC73FCH1H020C	CHIP C 2.0PF C		
C88			CC45SL2H560J	CERAMIC 56PF J		
C89			CC45SL2H470J	CERAMIC 47PF J		
C90 -92			CK73FB1H102K	CHIP C 1000PF K		
C93			CC73FCH1H0R5C	CHIP C 0.5PF C		
C94			CM73F2H300J	CHIP C 30PF J		
C95			CC73FCH1H020C	CHIP C 2.0PF C		
C96			CK73FB1E103K	CHIP C 0.01UF K		
C98			CK73FB1H102K	CHIP C 1000PF K		
C99			CE04NW1E100M	ELECTRO 10UF 25WV		
C100			CK73FB1H102K	CHIP C 1000PF K	K	
C101			CE04NW1E100M	ELECTRO 10UF 25WV		
C103			CK73FB1H102K	CHIP C 1000PF K		
C104			CK73FB1E103K	CHIP C 0.01UF K		
C105			CK73FB1H223K	CHIP C 0.022UF K		
C110			CC73FCH1H030C	CHIP C 3PF C		
C111			CK73FB1E103K	CHIP C 0.01UF K		
C112			CE04NW1A221M	ELECTRO 220UF 10WV		
C113			CC73FCH1H100D	CHIP C 10PF D		
C114,115			CC73FSL1H101J	CHIP C 100PF J		
C116			CC73FCH1H080D	CHIP C 8PF D		
C119			CE04NW1E100M	ELECTRO 10UF 25WV		
C120-127			CC73FSL1H101J	CHIP C 100PF J		
C128,129			CK73FB1H102K	CHIP C 1000PF K		
C130			CE04EW1C102M	ELECTRO 1000UF 16WV		
TC1			C05-0345-05	TRIMMING CAP 10PF		
		*	E22-0672-04	TERMINAL BOARD		
		*	E22-0673-04	TERMINAL BOARD		
110	2C		E30-2145-05	ANT CABLE		
CN1 ,2		*	E40-5461-05	PIN ASSY		
J1		*	E11-0442-05	PHONE JACK		
115	1B	*	F10-1444-03	SHIELDING COVER		
		*	F10-1446-04	SHIELDING PLATE		
		*	F10-1457-04	SHIELDING CASE (VCO-PLL)		
		*	G02-0600-04	FLAT SPRING (THERMAL SWITCH)		
		*	G02-0705-04	FLAT SPRING		
		*	G11-0660-04	SHEET (VCO 25X10)		
		*	G11-0661-04	INSULATION SHEET(APC TR)		
			G13-0841-04	CUSHION (CRYSTAL)		
		*	G13-1319-04	CUSHION (VCO 22X15)		

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			G53-0508-04	NON-WOVEN FABRIC		
CD1			L79-1013-05	FILTER		
CF1			L72-0372-05	CERAMIC FILTER (CFWM455F)		
L1 -4		*	L34-4252-05	COIL		
L5			L40-1582-19	SMALL FIXED INDUCTOR (0.15UH)		
L6		*	L34-4251-05	COIL		
L8 ,9			L34-1185-05	COIL (2.5T)		
L10			L40-3382-19	SMALL FIXED INDUCTOR (0.33UH)		
L11			L34-1239-05	COIL (10.5T)		
L12			L34-0895-05	COIL (6T)		
L13			L34-0742-05	COIL (6T)		
L14			L34-0908-05	COIL (9.5T)		
L15 -17			L34-0499-05	COIL (4T)		
L19			L40-8272-48	SMALL FIXED INDUCTOR (82NH)		
L20			L40-1001-19	SMALL FIXED INDUCTOR (10UH)		
X1			L77-1405-05	CRYSTAL RESONATOR (12.8MHZ)		
X2			L77-0946-15	CRYSTAL RESONATOR (10.245MHZ)		
XF1			L71-0228-05	CRYSTAL FILTER (10.7MHZ)		
N	2B		N09-0623-04	SCREW (MODULE)		
J	2B		N87-2606-46	TAPTITE SCREW(PCB,ANT)		
L	1B		N88-2606-46	TAPTITE SCREW(COVER,THERMAL SW		
R4			RK73FB2A103J	CHIP R 10K J 1/10W		
R5			RK73FB2A333J	CHIP R 33K J 1/10W		
R6			RK73FB2A274J	CHIP R 270K J 1/10W		
R7			RK73FB2A101J	CHIP R 100 J 1/10W		
R8			RK73FB2A103J	CHIP R 10K J 1/10W		
R9			RK73FB2A101J	CHIP R 100 J 1/10W		
R10 -12			RK73FB2A103J	CHIP R 10K J 1/10W		
R13			RK73FB2A473J	CHIP R 47K J 1/10W		
R14			RK73FB2A104J	CHIP R 100K J 1/10W		
R15			RK73FB2A683J	CHIP R 68K J 1/10W	K	
R16			RK73FB2A823J	CHIP R 82K J 1/10W	K	
R17			R92-0670-05	CHIP R 0 OHM		
R18			RK73FB2A470J	CHIP R 47 J 1/10W		
R19			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R20			RK73FB2A152J	CHIP R 1.5K J 1/10W		
R21			RK73FB2A471J	CHIP R 470 J 1/10W		
R22			RK73FB2A101J	CHIP R 100 J 1/10W		
R23			RK73FB2A103J	CHIP R 10K J 1/10W		
R24			RK73FB2A473J	CHIP R 47K J 1/10W		
R25			RK73FB2A103J	CHIP R 10K J 1/10W		
R30			R92-0670-05	CHIP R 0 OHM	K	
R31			RK73FB2A394J	CHIP R 390K J 1/10W		
R33 ,34			R92-0670-05	CHIP R 0 OHM		
R35			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R36			RK73FB2A101J	CHIP R 100 J 1/10W		
R37			R92-0670-05	CHIP R 0 OHM		
R38			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R39 -41			RK73FB2A103J	CHIP R 10K J 1/10W		
R42			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R43			RK73FB2A223J	CHIP R 22K J 1/10W		
R44			RK73FB2A273J	CHIP R 27K J 1/10W		
R45			RK73FB2A473J	CHIP R 47K J 1/10W		

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TX-RX UNIT/144 (X53-3580-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
R46			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R47			R92-0670-05	CHIP R 0 OHM		
R49			RK73FB2A223J	CHIP R 22K J 1/10W		
R50			RK73FB2A124J	CHIP R 120K J 1/10W		
R52 -54			RK73FB2A473J	CHIP R 47K J 1/10W		
R55			RK73FB2A471J	CHIP R 470 J 1/10W		
R56			RK73FB2A104J	CHIP R 100K J 1/10W		
R57			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R58			RK73FB2A473J	CHIP R 47K J 1/10W		
R59			R92-0670-05	CHIP R 0 OHM		
R60			RK73FB2A103J	CHIP R 10K J 1/10W		
R61			RK73FB2A471J	CHIP R 470 J 1/10W		
R62			R92-0670-05	CHIP R 0 OHM		
R63 ,64			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R65 ,66			R92-0670-05	CHIP R 0 OHM		
R67			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R68			RK73FB2A220J	CHIP R 22 J 1/10W		
R69			RK73FB2A470J	CHIP R 47 J 1/10W		
R71			R92-0670-05	CHIP R 0 OHM		
R73			RK73FB2A104J	CHIP R 100K J 1/10W		
R75			RK73FB2A103J	CHIP R 10K J 1/10W		
R76			R92-0670-05	CHIP R 0 OHM		
R78			R92-1213-05	CARBON 100 J 1/2W		
R79 ,80			RK73FB2A223J	CHIP R 22K J 1/10W		
R81			RK73FB2A471J	CHIP R 470 J 1/10W		
R82			R92-0685-05	CHIP R 22 J 1/2W		
R83			R92-0670-05	CHIP R 0 OHM		
R84 -86			R92-0670-05	CHIP R 0 OHM		
R89			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R90			RK73FB2A221J	CHIP R 220 J 1/10W		
R91			RK73FB2A473J	CHIP R 47K J 1/10W		
R93			RK73FB2A104J	CHIP R 100K J 1/10W		
R98 ,99			RK73FB2A103J	CHIP R 10K J 1/10W		
VR1			R12-6429-05	TRIM POT. 100K		
VR2			R12-6427-05	TRIM POT. 47K		
VR3 ,4			R12-6423-05	TRIM POT. 10K		
TS1		*	S79-0401-05	THERMAL SWITCH 95°C		
D1			1SV164	DIODE		
D2			1SV166	DIODE		
D3 ,4			1SV164	DIODE		
D5			1SV166	DIODE		
D6			1SV164	DIODE		
D7			1SV166	DIODE		
D11			1SS184	DIODE		
D12			1SS184	DIODE		
D13			DAN235(K)	DIODE		
D14			1SS181	DIODE		
D15			MI407	DIODE		
D16			MI308	DIODE		
D17 ,18			1SS226	DIODE		
D19			DSA3A1	DIODE		
IC1			BU4094BF	IC		
IC2			LA5010M	IC(LOW SATURATION REGULATOR)		

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TX-RX UNIT/144 (X53-3580-XX)
TX-RX UNIT/440 (X57-3590-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
IC5			KCD04	IC(FM IF)		
IC6		*	KCD05	IC(AM IF)	K	
IC7		*	KCA04	IC(MIC AMP)		
IC8		*	KCB11	IC(DRIVE)		
IC9		*	KCC04	IC(APC)		
IC10			S-AV17	IC(POWER MODULE FOR 144MHZ)		
IC11		*	KCH05	IC(144 PLL-VCO)		
Q1			3SK184(S)	FET		
Q2			3SK179(L)	FET		
Q3			2SC2714(Y)	TRANSISTOR		
Q4			DTA114YK	DIGITAL TRANSISTOR	K	
Q5 ,6			DTC123JK	DIGITAL TRANSISTOR	K	
Q7			DTC143EK	DIGITAL TRANSISTOR	K	
Q10			2SA1362(Y)	TRANSISTOR		
Q11			2SB1119S	TRANSISTOR		
Q12			DTC144WK	DIGITAL TRANSISTOR		
Q13 ,14			2SC2712(Y)	TRANSISTOR		
Q15 -17			DTC144EK	DIGITAL TRANSISTOR		
Q18			2SD1757(K)	TRANSISTOR		
Q19			2SK208(Y)	FET		
Q20			2SC2714(Y)	TRANSISTOR		
Q21			2SC2712(Y)	TRANSISTOR		
Q22			FMG1	TRANSISTOR		
Q23		*	2SD1902R	TRANSISTOR		
Q24			2SJ106(GR)	FET		
TX-RX UNIT/440 (X57-3590-XX) -11:K, P, -21:M						
C2 -4			CK73FB1H102K	CHIP C 1000PF K		
C5			CC73FCH1H1R5C	CHIP C 1.5PF C		
C6			CC73FCH1H390J	CHIP C 39PF J		
C7			CK73FB1H102K	CHIP C 1000PF K		
C9			CC73FCH1H010C	CHIP C 1.0PF C		
C10			CC73FCH1H390J	CHIP C 39PF J		
C11			CK73FB1H102K	CHIP C 0.001UF K		
C13 ,14			CK73FB1H102K	CHIP C 1000PF K		
C15			CC73FCH1H050C	CHIP C 5PF C		
C16 ,17			CK73FB1H102K	CHIP C 1000PF K		
C18			CC73FCH1H060D	CHIP C 6PF D		
C19 ,20			CK73FB1H102K	CHIP C 1000PF K		
C20 ,21			CC73FCH1H330J	CHIP C 33PF J	M	
C21			CC73FCH1H560J	CHIP C 56PF J	K,P	
C22			CC73FCH1H180J	CHIP C 18PF J	K,P	
C22			CC73FCH1H330J	CHIP C 33PF J	M	
C23			CK73FB1H102K	CHIP C 1000PF K		
C24			CE04NW1C470M	ELECTRO 47UF 16WV		
C25			CK73FB1H102K	CHIP C 1000PF K		
C26		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C27			C92-0003-05	CHIP-TAN 0.47UF 25WV		
C28 ,29		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C31			CK73FB1H102K	CHIP C 1000PF K		
C32			CE04NW1C470M	ELECTRO 47UF 16WV		
C33			C92-0504-05	CHIP-TAN 0.68UF 20WV		
C34			CE04NW1C470M	ELECTRO 47UF 16WV		

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TX-RX UNIT/440 (X57-3590-XX)

Ref. No. 参照番号	Address 位 置	New Parts 新	Parts No. 部 品 番 号	Description 部 品 名／規 格	Desti-nation 仕 向	Re-marks 備考
C35			CK73FB1H102K	CHIP C 1000PF K		
C36			CE04NW1C470M	ELECTRO 47UF 16WV		
C37			CK73FB1H102K	CHIP C 1000PF K		
C38			CK73FB1H822K	CHIP C 8200PF K		
C39			CK73FB1H102K	CHIP C 1000PF K		
C40		*	CK73FF1C105Z	CHIP C 1.0UF Z		
C41			CC73FUJ1H330J	CHIP C 33PF J		
C42			CC73FUJ1H100D	CHIP C 10PF D		
C43			CK73FB1H102K	CHIP C 1000PF K		
C44			CC73FCH1H060D	CHIP C 6PF D		
C45			CK73FB1H102K	CHIP C 1000PF K		
C46			CC73FCH1H060D	CHIP C 6PF D		
C47			CK73FB1H102K	CHIP C 1000PF K		
C48			CE04NW1C101M	ELECTRO 100UF 16WV		
C49			CK73FB1H102K	CHIP C 1000PF K		
C50		*	CE04NW1A330M	ELECTRO 33UF 10WV		
C51 ,52			CK73FB1H102K	CHIP C 1000PF K		
C53			CE04NW1C101M	ELECTRO 100UF 16WV		
C54 -58			CK73FB1H102K	CHIP C 1000PF K		
C59			CC73FCH1H040C	CHIP C 4PF C		
C60			CE04NW1C220M	ELECTRO 22UF 16WV		
C62			CK73FB1H102K	CHIP C 1000PF K		
C64 ,65			CK73FB1H102K	CHIP C 1000PF K		
C66			CM73F2H030D	CHIP C 3.00F D	K,P	
C66			CM73F2H060D	CHIP C 6.0PF D	M	
C67			CC73FCH1H070D	CHIP C 7PF D		
C68			CC45SL2H150J	CERAMIC 15PF J		
C69			CC45SL2H180J	CERAMIC 18PF J		
C70			CC45SL2H220J	CERAMIC 22PF J		
C71			CC73FCH1H0R5C	CHIP C 0.5PF C		
C72			CC73FCH1H020C	CHIP C 2.0PF C		
C73			CC45SL2H080D	CERAMIC 8.0PF D		
C74			CC45SL2H100D	CERAMIC 10PF D		
C75			CC73FCH1H0R5C	CHIP C 0.5PF C		
C76			CC73FCH1H020C	CHIP C 2.0PF C		
C77			CM73F2H060D	CHIP C 6.0PF D		
C78 -80			CK73FB1H102K	CHIP C 1000PF K		
C81			C90-2092-05	ELECTRO 1800PF 16WV		
C82 -85			CC73FSL1H101J	CHIP C 100PF J		
C86			CK73FB1H102K	CHIP C 1000PF K		
C87			CK73FB1H333K	CHIP C 0.033UF K		
C88			CE04NW1A221M	ELECTRO 220UF 10WV		
C92			CK73FB1H471K	CHIP C 470PF K		
C93			CE04NW1C470M	ELECTRO 47UF 16WV		
C94 ,95			CC73FCH1H030C	CHIP C 3PF C		
C96			CK73FB1H102K	CHIP C 1000PF K		
C97			CK73FB1E104K	CHIP C 0.10UF K		
C98			CC73FCH1H040C	CHIP C 4PF C		
C99			CC73FCH1H020C	CHIP C 2.0PF C		
C100			CC73FCH1H070D	CHIP C 7PF D		
C102			CE04NW1C100M	ELECTRO 10UF 16WV		
C103,104			CK73FB1H102K	CHIP C 1000PF K		
C105-110			CC73FSL1H101J	CHIP C 100PF J		
C111			CK73FB1H103K	CHIP C 0.010UF K		
C112			CK73FB1H102K	CHIP C 1000PF K		

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TX-RX UNIT/440 (X57-3590-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
C113			CC73FCH1H020C	CHIP C 2.0PF C		
C114			CK73FB1E223K	CHIP C 0.022UF K		
C115-117			CK73FB1H102K	CHIP C 0.001UF K		
C118			CC73FCH1H150J	CHIP C 15PF J	K,P	
TC1 ,2			C05-0346-05	TRIM CAP 6PF		
TC3			C05-0371-05	TRIM CAP 10PF		
		*	E22-0672-04	TERMINAL BOARD		
		*	E22-0673-04	TERMINAL BOARD		
119	2C	*	E30-3007-05	DC CORD		
120	2C	*	E30-3009-05	ANT CABLE (M TYPE COVER)		
CN1 ,2		*	E40-5461-05	PIN ASSY (12P)		
J1		*	E11-0442-05	PHONE JACK		
TP1			E04-0154-05	RF COAXIAL CABLE RECEPTACLE		
			F05-1531-05	FUSE (10A)		
125	2C	*	F10-1444-03	SHIELDING PLATE (UPSIDE)		
		*	F10-1446-04	SHIELDING PLATE (MODULE)		
		*	F10-1457-04	SHIELDING CASE (VCO-PLL)		
		*	F10-1477-14	SHIELDING PLATE (MIX)		
		*	G02-0599-04	FLAT SPRING (DB TR)		
		*	G02-0600-04	SPRING (THERMAL SWITCH)		
		*	G02-0704-04	SPRING		
		*	G02-0705-04	SPRING		
		*	G09-0426-05	SPRING (DC CORD)		
			G11-0660-04	SHEET (VCO 25X10)		
		*	G11-0661-04	INSULATION SHEET(DB TR)		
		*	G11-0654-04	SHEET (VCO 30X20)		
		*	G11-0655-04	SHEET (CN1,2 55X8)		
		*	G11-0656-14	CONDUCTIVE SHEET(MCF)		
			G13-0841-04	CUSHION (12.8M XTAL)		
			G13-1319-04	CUSHION (VCO 22X15)		
			G53-0508-04	NON-WOVEN FABRIC		
CD1			L79-1013-05	FILTER		
CF1			L72-0372-05	CERAMIC FILTER (CFWM455F)		
L1			L40-1872-80	SMALL FIXED INDUCTOR (18NH)		
L2			L40-1572-48	SMALL FIXED INDUCTOR (15NH)		
L3		*	L79-1016-05	FILTER		
L4		*	L79-1017-05	FILTER (430)	M	
L4		*	L79-1018-05	FILTER (440)	K,P	
L5			L40-2272-48	SMALL FIXED INDUCTOR (22NH)	K,P	
L5			L40-3372-48	SMALL FIXED INDUCTOR (33NH)	M	
L6			L40-3372-48	SMALL FIXED INDUCTOR (33NH)		
L7		*	L34-4250-05	COIL		
L8			L40-2272-48	SMALL FIXED INDUCTOR (22NH)		
L9			L34-1238-05	COIL (9.5T)		
L10			L34-1185-05	COIL (2.5T)		
L11			L34-1032-05	COIL (3.5T)		
L12			L34-1226-05	COIL (1.5T)		
L13			L34-1238-05	COIL (9.5T)		
L14			L34-1226-05	COIL (1.5T)		
L15			L40-1872-48	SMALL FIXED INDUCTOR (18NH)		
L16			L40-1001-19	SMALL FIXED INDUCTOR (10UH)		
X1		*	L77-1445-05	CRYSTAL RESONATOR (21.145MHZ)		
X2			L77-1405-05	CRYSTAL RESONATOR (12.8MHZ)		
XF1		*	L71-0411-05	MCF (21.6MHZ)		

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TX-RX UNIT/440 (X57-3590-XX)
TX-RX UNIT/1200 (X57-3600-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
VR3 ,4			R12-6423-05	TRIM POT. 10K		
TS1		*	S59-0444-05	THERMAL SWITCH 90°C		
D1			HSK277	DIODE		
D4			MA862	DIODE		
D5			1SS181	DIODE		
D6			1SS184	DIODE		
D7			1SS184	DIODE		
D8			MI407	DIODE		
D9			MI808	DIODE		
D10 ,11			MA716	DIODE		
D12			DSA3A1	DIODE		
D13			1SS184	DIODE		
D14			MA716	DIODE		
D15			MA862	DIODE		
IC1			KCD04	IC(FM IF)		
IC2		*	KCA04	IC(MIC AMP)		
IC3			BU4094BF	IC		
IC4			LA5010M	IC(LOW SATURATION REGULATOR)		
IC5		*	KCC04	IC(APC)		
IC6		*	KCB14	IC(DRIVE)		
IC7			M57788M	IC(POWER MODULE/ 430-450MHZ)		
IC10		*	KCH07	IC(VCO-PLL 430)		
Q1			3SK184(S)	FET		
Q2			2SK582	FET		
Q3			3SK184(S)	FET		
Q5			2SC2714(Y)	TRANSISTOR		
Q8			2SA1362(Y)	TRANSISTOR		
Q9			DTC144WK	DIGITAL TRANSISTOR		
Q10 ,11			2SC2712(Y)	TRANSISTOR		
Q12			2SB1119S	TRANSISTOR		
Q13 -15			DTC144EK	DIGITAL TRANSISTOR		
Q16			2SD1757(K)	TRANSISTOR		
Q17			2SC2712(Y)	TRANSISTOR		
Q18			2SC3123	TRANSISTOR		
Q19			FMG1	TRANSISTOR		
Q20		*	2SD1760(Q)	TRANSISTOR		
Q21			2SJ106(GR)	FET		

TX-RX UNIT/1200 (X57-3600-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
C1			CC73FCH1H220J	CHIP C 22PF J		
C2 -5			CK73FB1H471K	CHIP C 470PF K		
C7			CC73FCH1H100D	CHIP C 10PF D		
C8			CC73FSL1H101J	CHIP C 100PF J		
C9		*	CC73FCH1H1R5B	CHIP C 1.5PF B		
C10 ,11			CC73FCH1H470J	CHIP C 47PF J		
C12			CK73FB1E103K	CHIP C 0.01UF K		
C13		*	CC73FCH1H1R5B	CHIP C 1.5PF B		
C14			CC73FSL1H101J	CHIP C 100PF J		
C15			CK73FB1H471K	CHIP C 470PF K		
C17			CC73FSL1H101J	CHIP C 100PF J		
C18		*	CC73FCH1H1R5B	CHIP C 1.5PF B		
C19			CE04NW1C470M	ELECTRO 47UF 16WV		
C21 ,22			CK73FB1H471K	CHIP C 470PF K		
C23			CC73FCH1H030C	CHIP C 3PF C		

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TX-RX UNIT/440 (X57-3590-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
P	-		N09-2077-05	SCREW (MODULE)		
J	3C		N87-2606-46	TAPTITE SCREW(PCB,ANT)		
L	2C,3C		N88-2606-46	TAPTITE SCREW(COVER,THERMAL SW		
R2			RK73FB2A104J	CHIP R 100K J 1/10W		
R3			RK73FB2A333J	CHIP R 33K J 1/10W		
R4 ,5			RK73FB2A101J	CHIP R 100 J 1/10W		
R6			RK73FB2A470J	CHIP R 47 J 1/10W		
R7			RK73FB2A220J	CHIP R 22 J 1/10W		
R9			R92-0670-05	CHIP R 0 OHM		
R10			RK73FB2A223J	CHIP R 22K J 1/10W		
R11			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R12 ,13			R92-0670-05	CHIP R 0 OHM		
R14 ,15			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R17			RK73FB2A221J	CHIP R 220 J 1/10W		
R18			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R19			RK73FB2A470J	CHIP R 47 J 1/10W		
R20			R92-0670-05	CHIP R 0 OHM		
R21			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R22			RK73FB2A334J	CHIP R 330K J 1/10W		
R24			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R25			RK73FB2A471J	CHIP R 470 J 1/10W		
R26			RK73FB2A473J	CHIP R 47K J 1/10W		
R27			RK73FB2A223J	CHIP R 22K J 1/10W		
R28			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R29 -31			RK73FB2A103J	CHIP R 10K J 1/10W		
R32			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R33 -35			RK73FB2A473J	CHIP R 47K J 1/10W		
R36			RK73FB2A154J	CHIP R 150K J 1/10W		
R37			RK73FB2A273J	CHIP R 27K J 1/10W		
R38			RK73FB2A152J	CHIP R 1.5K J 1/10W		
R40			RK73FB2A221J	CHIP R 220 J 1/10W		
R42			R92-0670-05	CHIP R 0 OHM		
R43			RK73FB2A471J	CHIP R 470 J 1/10W		
R44			RK73FB2A103J	CHIP R 10K J 1/10W		
R45 ,46			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R47			RK73EB2B220J	CHIP R 22 J 1/8W		
R48			R92-0670-05	CHIP R 0 OHM		
R49			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R51			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R52			RK73FB2A104J	CHIP R 100K J 1/10W		
R53			R92-0685-05	CHIP R 22 J 1/2W		
R55			R92-0670-05	CHIP R 0 OHM		
R58			R92-0679-05	CHIP R 0 OHM		
R59			R92-1214-05	CHIP R 120 J 1/2W		
R60 ,61			RK73FB2A103J	CHIP R 10K J 1/10W		
R62			RK73FB2A221J	CHIP R 220 J 1/10W		
R63			RK73FB2A473J	CHIP R 47K J 1/10W		
R64			RK73FB2A104J	CHIP R 100K J 1/10W		
R65			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R66			RK73FB2A473J	CHIP R 47K J 1/10W		
R67 ,68			RK73FB2A103J	CHIP R 10K J 1/10W		
R69			RK73FB2A474J	CHIP R 470K J 1/10W	K,P	
VR1			R12-6429-05	TRIMMING POT.100K		
VR2			R12-6427-05	TRIM POT. 47K		

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TM-941A

PARTS LIST

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TX-RX UNIT/1200 (X57-3600-11)

Ref. No. 参照番号	Address 位　置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
C24			CC73FCH1H1R5C	CHIP C 1.5PF C		
C25			CK73FB1H102K	CHIP C 1000PF K		
C26			CK73FB1H471K	CHIP C 470PF K		
C27			CK73FB1E223K	CHIP C 0.022UF K		
C28			CC73FCH1H080D	CHIP C 8PF D		
C29			CK73FB1E103K	CHIP C 0.01UF K		
C30			CC73FCH1H030C	CHIP C 3PF C		
C31			CC73FSL1H101J	CHIP C 100PF J		
C32			CC73FCH1H030C	CHIP C 3PF C		
C33			CK73FB1H471K	CHIP C 470PF K		
C34			CK73FB1H472K	CHIP C 4700PF K		
C35			CK73FB1H102K	CHIP C 1000PF K		
C36			CC73FCH1H150J	CHIP C 15PF J		
C37			CC73FCH1H220J	CHIP C 22PF J		
C38 -41			CK73FB1E103K	CHIP C 0.01UF K		
C42			CE04NW1C470M	ELECTRO 47UF 16WV		
C43 ,44			CK73EF1C105Z	CHIP C 1.0UF Z		
C45			C92-0002-05	CHIP-TAN 0.22UF 35WV		
C46			CK73FB1E104K	CHIP C 0.10UF K		
C47			CK73FB1H471K	CHIP C 470PF K		
C48			C92-0504-05	CHIP-TAN 0.68UF 20WV		
C49			C92-0004-05	CHIP-TAN 1.0UF 10WV		
C50			CK73FB1E223K	CHIP C 0.022UF K		
C51			CK73EF1C105Z	CHIP C 1.0UF Z		
C52			CC73FCH1H030C	CHIP C 3PF C		
C53			CK73FB1E473K	CHIP C 0.047UF K		
C54			CE04NW1C470M	ELECTRO 47UF 16WV		
C55			CK73EF1C105Z	CHIP C 1.0UF Z		
C56			CK73FB1E223K	CHIP C 0.022UF K		
C57			CK73FB1H471K	CHIP C 470PF K		
C58 ,59			CE04NW1C101M	ELECTRO 100UF 16WV		
C60			CK73FB1H471K	CHIP C 470PF K		
C61		*	CE04NW1A330M	ELECTRO 33UF 10WV		
C62 ,63			CK73FB1E103K	CHIP C 0.01UF K		
C64			CE04NW1C101M	ELECTRO 100UF 16WV		
C65			CC73GCH1H030C	CHIP C 3PF C		
C66			CC73GCH1H1D1J	CHIP C 100PF J		
C67 ,68			CC73GCH1H020C	CHIP C 2.0PF C		
C69			CC73GCH1H101J	CHIP C 100PF J		
C70			CC73GCH1H050C	CHIP C 5PF C		
C71			CK73EF1C105Z	CHIP C 1.0UF Z		
C72			CE04NW1E100M	ELECTRO 10UF 25WV		
C73 ,74			CK73FB1H471K	CHIP C 470PF K		
C75			CK73GB1H471K	CHIP C 470PF K		
C76			CK73FB1H471K	CHIP C 470PF K		
C77			CK73FB1E103K	CHIP C 0.01UF K		
C78 -80			CK73FB1H471K	CHIP C 470PF K		
C81			CK73EF1C105Z	CHIP C 1.0UF Z		
C82 -84			CK73FB1H471K	CHIP C 470PF K		
C85			CE04NW1E100M	ELECTRO 10UF 25WV		
C86			CK73EF1C105Z	CHIP C 1.0UF Z		
C87 ,88			CK73GB1H471K	CHIP C 470PF K		
C89 ,90			CK73FB1H471K	CHIP C 470PF K		
C91			CE04NW1C470M	ELECTRO 47UF 16WV		
C92			CC73FCH1H470J	CHIP C 47PF J		

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TX-RX UNIT/1200 (X57-3600-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
C93 ,94			CK73FB1H471K	CHIP C 470PF K		
C95			CC73FCH1H010C	CHIP C 1PF C		
C96			CC73FCH1H100D	CHIP C 10PF D		
C97			CK73FB1H471K	CHIP C 470PF K		
C98			CM73F2H470J	CHIP C 47PF J		
C99			CC73FSL1H101J	CHIP C 100PF J		
C100			CK73FB1E103K	CHIP C 0.01UF K		
C101			CC73FCH1H080D	CHIP C 8PF D		
C102-104			CK73FB1H471K	CHIP C 470PF K		
C105		*	CC73FCH1HR75B	CHIP C 0.75PF B		
C106			CK73FB1H471K	CHIP C 470PF K		
C107			CC73FSL1H101J	CHIP C 100PF J		
C108-110			CK73FB1H471K	CHIP C 470PF K		
C111			CC73FSL1H101J	CHIP C 100PF J		
C112			CK73FB1H471K	CHIP C 470PF K		
C113			CK73FB1H102K	CHIP C 1000PF K		
C114-116			CK73FB1H471K	CHIP C 470PF K		
C117			CK73GB1H102K	CHIP C 1000PF K		
C118			CK73FB1E103K	CHIP C 0.01UF K		
C119			CC73FSL1H101J	CHIP C 100PF J		
C120			CC73FUJ1H221J	CHIP C 220PF J		
C123-130			CK73FB1H471K	CHIP C 470PF K		
C131			CK73GB1H103K	CHIP C 0.01UF K		
C132			CK73GB1H471K	CHIP C 470PF K		
C133			CK73FB1E103K	CHIP C 0.01UF K		
C134-137			CK73FB1H471K	CHIP C 470PF K		
C138			CE04NW0J470M	ELECTRO 47UF 6.3WV		
C139			CC73FSL1H101J	CHIP C 100PF J		
C140			CK73FB1E104K	CHIP C 0.10UF K		
C141,142			CK73FB1H471K	CHIP C 470PF K		
C144,145			CC73FSL1H101J	CHIP C 100PF J		
C147-156			CC73GCH1H101J	CHIP C 100PF J		
C157			CK73GB1H102K	CHIP C 0.001UF K		
C158			CK73FB1H102K	CHIP C 0.001UF K		
		*	E22-0672-04	TERMINAL BOARD		
		*	E22-0673-04	TERMINAL BOARD		
130	3C	*	E30-3011-05	ANT CABLE		
CN1 ,2		*	E40-5461-05	PIN ASSY (12P)		
J1		*	E11-0442-05	PHONE JACK		
135	3C	*	F10-1444-03	SHIELDING PLATE (UPSIDE)		
		*	F10-1445-04	SHIELDING PLATE (VCO)		
		*	F10-1446-04	SHIELDING PLATE (MODULE)		
		*	F10-1457-04	SHIELDING PLATE		
		*	F10-1475-04	SHIELDING PLATE (MODULE)		
		*	G02-0599-04	FLAT SPRING (IC)		
		*	G02-0706-04	SPRING		
		*	G11-0661-04	INSULATION SHEET (IC)		
		*	G11-0654-04	SHEET (VCO 30X20)		
		*	G11-0655-04	SHEET (CN1,2 55X8)		
			G11-0660-04	SHEET (VCO 25X10)		
			G13-1319-04	CUSHON (VCO 22X15)		
			G53-0508-04	NON-WOVEN FABRIC		
		*	J42-0471-04	BUSHING (DC CABLE)		

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TX-RX UNIT/1200 (X57-3600-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti- nation 仕向	Re- marks 備考
CD1			L79-1013-05	FILTER		
CF1			L72-0366-05	CERAMIC FILTER (CFWM455E)		
L1 ,2		*	L79-1015-05	FILTER		
L4		*	L34-4259-05	COIL		
L5			L71-0280-05	MCF		
L6			L34-2034-05	COIL		
L7		*	L40-3982-19	SMALL FIXED INDUCTOR (0.39UH)		
L8			L40-5682-19	SMALL FIXED INDUCTOR (0.56UH)		
X1			L77-1375-05	CRYSTAL RESONATOR (59.245MHZ)		
X2			L77-1376-25	TCXO (12.8MHZ)		
P	-		N09-2077-05	SCREW		
J	3C		N87-2606-46	TAPTITE SCREW(PCB,ANT)		
L	3C		N88-2606-46	TAPTITE SCREW(COVER)		
R1 ,2			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R4			RK73FB2A473J	CHIP R 47K J 1/10W		
R5			RK73GB1J473J	CHIP R 47K J 1/16W		
R6			RK73FB2A560J	CHIP R 56 J 1/10W		
R7			RK73FB2A221J	CHIP R 220 J 1/10W		
R9			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R10			RK73FB2A153J	CHIP R 15K J 1/10W		
R11			RK73FB2A471J	CHIP R 470 J 1/10W		
R13			R92-0670-05	CHIP R 0 OHM		
R14			RK73GB1J180J	CHIP R 18 J 1/16W		
R15			RK73FB2A101J	CHIP R 100 J 1/10W		
R16			RK73FB2A331J	CHIP R 330 J 1/10W		
R17			RK73FB2A100J	CHIP R 10 J 1/10W		
R19			RK73FB2A151J	CHIP R 150 J 1/10W		
R20			RK73FB2A101J	CHIP R 100 J 1/10W		
R21			R92-0670-05	CHIP R 0 OHM		
R22			RK73FB2A331J	CHIP R 330 J 1/10W		
R23			RK73FB2A224J	CHIP R 220K J 1/10W		
R24			RK73FB2A561J	CHIP R 560 J 1/10W		
R25			RK73FB2A103J	CHIP R 10K J 1/10W		
R26			RK73FB2A473J	CHIP R 47K J 1/10W		
R27			RK73FB2A471J	CHIP R 470 J 1/10W		
R29			R92-0670-05	CHIP R 0 OHM		
R30			RK73FB2A221J	CHIP R 220 J 1/10W		
R31			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R32			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R33			RK73FB2A334J	CHIP R 330K J 1/10W		
R34			RK73FB2A223J	CHIP R 22K J 1/10W		
R35			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R36 ,37			RK73FB2A103J	CHIP R 10K J 1/10W		
R38			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R39 -41			RK73FB2A103J	CHIP R 10K J 1/10W		
R42			RK73FB2A474J	CHIP R 470K J 1/10W		
R43 -45			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R46			RK73FB2A684J	CHIP R 680K J 1/10W		
R47			RK73FB2A823J	CHIP R 82K J 1/10W		
R48			RK73FB2A331J	CHIP R 330 J 1/10W		
R49			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R50			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R51			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R52			RK73FB2A560J	CHIP R 56 J 1/10W		

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TX-RX UNIT/1200 (X57-3600-11)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
R53			RK73GB1J470J	CHIP R 47 J 1/16W		
R54			RK73GB1J103J	CHIP R 10K J 1/16W		
R55			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R56			RK73GB1J471J	CHIP R 470 J 1/16W		
R57			RK73FB2A100J	CHIP R 10 J 1/10W		
R58			RK73FB2A152J	CHIP R 1.5K J 1/10W		
R59			RK73FB2A683J	CHIP R 68K J 1/10W		
R60			R92-0670-05	CHIP R 0 OHM		
R61 ,62			RK73FB2A220J	CHIP R 22 J 1/10W		
R63			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R64			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R65			RK73GB1J471J	CHIP R 470 J 1/16W		
R66 ,67			RK73FB2A180J	CHIP R 18 J 1/10W		
R68			R92-0670-05	CHIP R 0 OHM		
R69			RK73FB2A333J	CHIP R 33K J 1/10W		
R70			R92-1201-05	SILID 220 1/2W		
R71			R92-0670-05	CHIP R 0 OHM		
R72		*	R92-1264-05	RESISTOR 5.6 1W		
R73			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R74			R92-0700-05	CHIP R 180 1/2W		
R75			RK73FB2A470J	CHIP R 47 J 1/10W		
R76			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R77			R92-0670-05	CHIP R 0 OHM		
R79 ,80			RK73FB2A103J	CHIP R 10K J 1/10W		
R81			RK73FB2A471J	CHIP R 470 J 1/10W		
R82			R92-0670-05	CHIP R 0 OHM		
R83			RK73FB2A4R7J	CHIP R 4.7 J 1/10W		
VR1			R12-6429-05	TRIMMING POT.100K		
VR2			R12-6421-05	TRIM POT. 4.7K		
VR3			R12-6427-05	TRIM POT. 47K		
VR4			R12-6423-05	TRIM POT. 10K		
VR5			R12-6427-05	TRIM POT. 47K		
D1			MA862	DIODE		
D3			MA716	DIODE		
D4			1SS193	DIODE		
D5			02CZ6.2(X,Y)	DIODE		
D6			1SS193	DIODE		
D7			1SS187	DIODE		
D8			02CZ12(X,Y)	DIODE		
D9			HSK151	DIODE		
D10 -13			MI808	DIODE		
D14			DSA3A1	DIODE		
D15			02CZ3.6(Y,Z)	DIODE		
D17			DAP202U	DIODE		
IC2			KCD04	IC(IF)		
IC3		*	KCX03	IC(ALT)		
IC4		*	KCA04	IC(MIC)		
IC5			BU4094BF	IC		
IC6			LA5009M	IC		
IC7		*	KCB09	IC(PRE DRIVE)		
IC8		*	KCB10	IC(DRIVE)		
IC9		*	KCC04	IC(APC)		
IC10			M67711	IC(POWER MODULE/ 1.24-1.3BHZ)		
IC11		*	KCH03	IC(PLL)		

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TX-RX UNIT/1200 (X57-3600-11)
LCD ASSY (B38-034X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
IC12			NJM78L05UA	IC		
Q1			MGF1502	IC		
Q2			2SC4095(R47.6)	TRANSISTOR		
Q3			3SK184(S)	FET		
Q6			2SC3356	TRANSISTOR		
Q7			2SC3120	TRANSISTOR		
Q8			2SA1362(Y)	TRANSISTOR		
Q9			2SB1302S	TRANSISTOR		
Q10			DTC144WK	DIGITAL TRANSISTOR		
Q11			FMW1	TRANSISTOR		
Q12 ,13			2SC2712(Y)	TRANSISTOR		
Q15 -17			DTC144EU	DIGITAL TRANSISTOR		
Q18			2SD1757(K)	TRANSISTOR		
Q19			2SA1362(Y)	TRANSISTOR		
Q20			DTC124EK	DIGITAL TRANSISTOR		
Q21 ,22			2SC4226(R23,24)	TRANSISTOR		
Q23			2SC2712(Y)	TRANSISTOR		
Q24		*	2SD1760(Q)	TRANSISTOR		
Q25			FMG1	TRANSISTOR		
Q26			2SJ106(GR)	FET		
Q28			DTC114EK	DIGITAL TRANSISTOR		
			LCD ASSY (B38-034X-XX) 1-05:K, P, 2-05:M			
D1 -6		*	B30-0892-05	LED(RED)		
D7		*	B30-0894-05	LED(ORG)		
D8		*	B30-0893-05	LED(GREEN)		
D9		*	B30-0894-05	LED(ORG)		
D10		*	B30-0893-05	LED(GREEN)		
D11		*	B30-0894-05	LED(ORG)		
D12		*	B30-0893-05	LED(GREEN)		
PL1 -6			B30-0865-05	LAMP		
C1 ,2			CC73ECH1H330J	CHIP C 33PF J		
C3			CK73EB1H223K	CHIP C 0.022UF K		
C4			CK73EB1H102K	CHIP C 1000PF K		
C5			CK73EB1H103K	CHIP C 0.01UF K		
C6			CK73EB1H102K	CHIP C 1000PF K		
C7			CK73EB1H223K	CHIP C 0.022UF K		
C8			CE04CW1C220M	ELECTRO 22UF 16WV		
C9			CK73EB1H102K	CHIP C 1000PF K		
C10 ,11			CC73ESL1H101J	CHIP C 100PF J		
C12			CE04CW1C220M	ELECTRO 22UF 16WV		
C13 -16			CK73EB1H102K	CHIP C 1000PF K		
C17			CK73EB1H223K	CHIP C 0.022UF K		
C18 -31			CK73EB1H103K	CHIP C 0.01UF K		
C32 ,33			CK73EB1H102K	CHIP C 1000PF K		
CN1			E40-3262-05	CONNECTOR		
CN2 -4		*	E40-5392-05	CONNECTOR (5P)		
CN5 -7		*	E40-5409-05	CONNECTOR (5P VR SIDE)		
X1			L77-1333-05	XTAL(4.19MHZ)		
R1			RK73EB2B473J	CHIP R 47K J 1/8W		
R2			RK73EB2B105J	CHIP R 1.0M J 1/8W		
R3			RK73EB2B103J	CHIP R 10K J 1/8W		
R4			RK73EB2B563J	CHIP R 56K J 1/8W		
R5			RK73EB2B104J	CHIP R 100K J 1/8W		

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LCD ASSY (B38-034X-XX)

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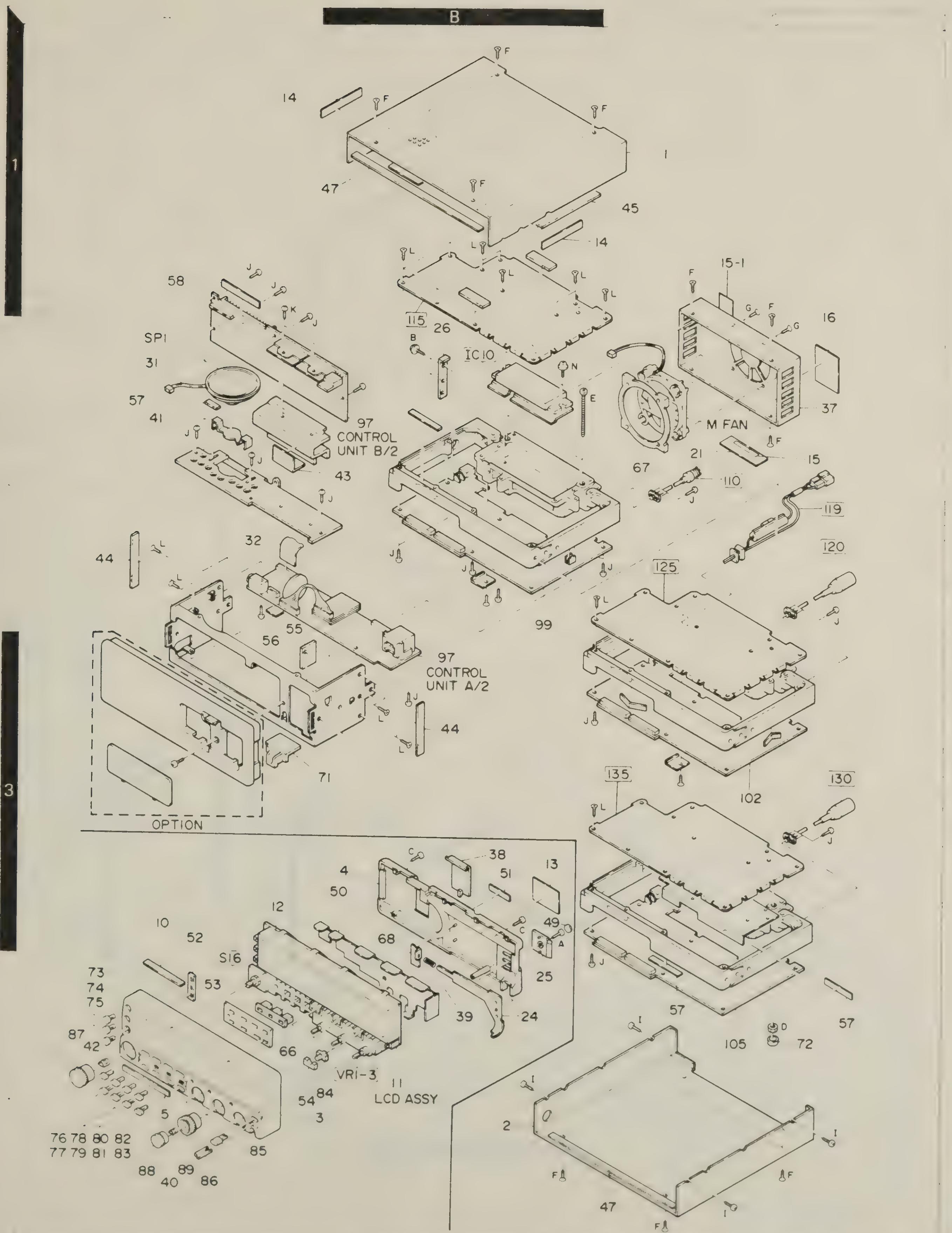
R6			RK73EB2B105J	CHIP R 1.0M J 1/8W		
R7			RK73EB2B223J	CHIP R 22K J 1/8W		
R8 ,9			RK73EB2B222J	CHIP R 2.2K J 1/8W		
R10 -13			RK73EB2B100J	CHIP R 10 J 1/8W		
R14 -17			RK73EB2B473J	CHIP R 47K J 1/8W		
R19			R92-0679-05	CHIP R 0 OHM		
R20			R92-0679-05	CHIP R 0 OHM	K,P	
R21 ,22			R92-0679-05	CHIP R 0 OHM		
R23 -25			RK73EB2B100J	CHIP R 10 J 1/8W		
R26 -31			RK73EB2B151J	CHIP R 150 J 1/8W		
R32 -34			RK73EB2B221J	CHIP R 220 J 1/8W		
R35			RK73EB2B473J	CHIP R 47K J 1/8W		
R36			RK73EB2B222J	CHIP R 2.2K J 1/8W		
R37			RK73EB2B272J	CHIP R 2.7K J 1/8W		
R38			RK73EB2B472J	CHIP R 4.7K J 1/8W		
R39			RK73EB2B123J	CHIP R 12K J 1/8W		
R40			RK73EB2B102J	CHIP R 1.0K J 1/8W		
R41			RK73EB2B222J	CHIP R 2.2K J 1/8W		
R42			R92-0686-05	CHIP R 33 J 1/2W		
R43			R92-1211-05	SOLID R 5.6K J 1/2W		
R44			RK73EB2B331J	CHIP R 330 J 1/8W		
VR1 -3	4B	*	R23-9407-05	POTENTIO M. (SQ,VOL)		
S1			S40-1079-05	TACT SWITCH		
S2 -14			S40-1086-05	TACT SWITCH		
S15			S40-2458-05	PUSH SWITCH (POWER SW)		
IC1			75328GC-093-3B9	IC(UPD)		
IC2 ,3			MSM5265GS-V1K	IC		
IC4		*	TA78L05F	IC(VOLTAGE REGULATOR/ +5V)		
IC5 ,6			TC4S11F	IC(2 INPUT NAND GATE)		
IC7			S-8054ALR	IC(VOLTAGE DETECTOR)		
Q1			2SC2712(Y)	TRANSISTOR		
Q2			2SA1162(Y)	TRANSISTOR		
Q3			2SC2712(Y)	TRANSISTOR		
Q4			2SA1307(Y)	TRANSISTOR		
Q5			2SB815	TRANSISTOR		
Q6 -12			DTA114EK	DIGITAL TRANSISTOR		
S16	4A		W02-0388-05	ENCODER		

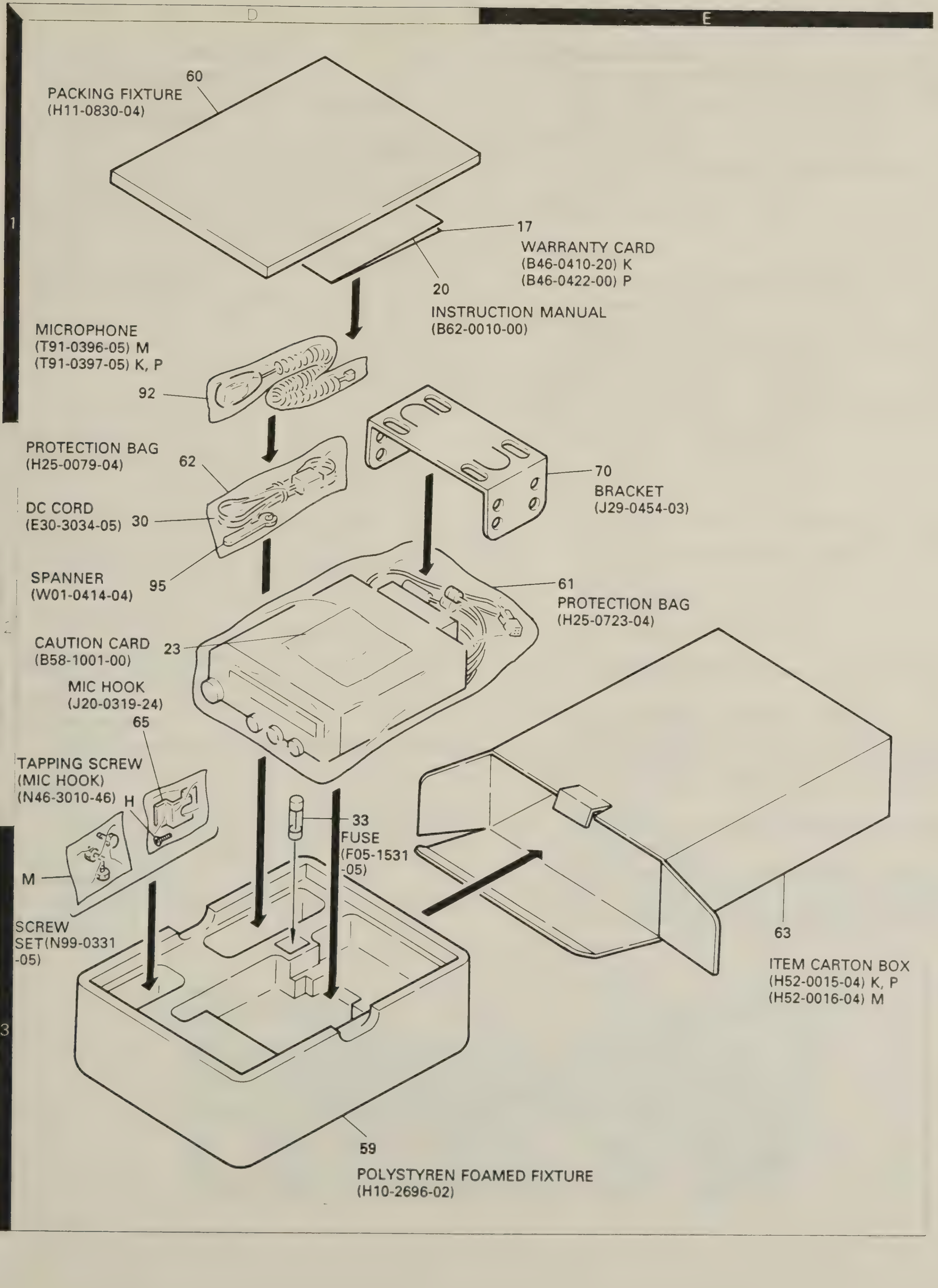
E: Scandinavia & Europe K: USA P: Canada W:Europe
U: PX(Far East, Hawaii) T: England M: Other Areas
UE : AAFES(Europe) X: Australia

⚠ indicates safety critical components

EXPLODED VIEW



PACKING


D
E
1
3
60
PACKING FIXTURE
(H11-0830-04)
17
WARRANTY CARD
(B46-0410-20) K
(B46-0422-00) P
20
INSTRUCTION MANUAL
(B62-0010-00)
MICROPHONE
(T91-0396-05) M
(T91-0397-05) K, P
92
PROTECTION BAG
(H25-0079-04)
62
70
BRACKET
(J29-0454-03)
DC CORD
(E30-3034-05)
30
SPANNER
(W01-0414-04)
95
61
PROTECTION BAG
(H25-0723-04)
CAUTION CARD
(B58-1001-00)
23
MIC HOOK
(J20-0319-24)
65
TAPPING SCREW
(MIC HOOK)
(N46-3010-46)
H
33
FUSE
(F05-1531
-05)
M
SCREW
SET(N99-0331
-05)
63
ITEM CARTON BOX
(H52-0015-04) K, P
(H52-0016-04) M
59
POLYSTYREN FOAMED FIXTURE
(H10-2696-02)

ADJUSTMENT

Required Test Equipment

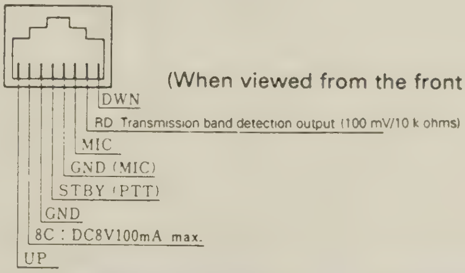
1. **Tester and DC V.M**
   Use a tester with high input impedance.
2. **RF VTVM (RF VM)**
   Input impedance: 1 M ohms or more, 2 pF or less
   Voltage range: FS = 10 mV to 300 V
   Measurable frequency: 1,300 MHz (maximum)
3. **Frequency counter (F counter)**
   Input sensitivity: Approximately 50 mV
   Measurable frequency: 1,300 MHz or more
4. **DC power supply**
   Voltage: 10 to 17 V (variable)
   Current: 12 A or more
5. **Power meter**
   Power measurement ranges : 100 W, 50 W, and 15 W
   Input impedance: 50 ohms
   Measurable frequency: 1,300 MHz
6. **AF vacuum voltmeter (AF VM)**
   Input impedance: 1 M ohms or more
   Voltage range: FS= 1 mV to 30 V
   Measurable frequency: 50 Hz to 10 kHz
7. **AF generator (AG)**
   Output frequency: 100 Hz to 10 kHz
   Output voltage: 0.5 mV to 1 V
8. **Linear detector**
   Measurable frequency: 1,300 MHz
9. **Spectrum analyzer**
   Measurable frequency: 1,300 MHz
10. **Directional coupler**
11. **Oscilloscope**
   Use a high-sensitivity oscilloscope with horizontal input socket.
12. **SSG**
   Use an SSG that produces a frequency of 144 to 1,300 MHz with amplitude and frequency modulation.
   Output level: 0.1µV to 100 mV
13. **Dummy resistor**
   Use an 8-ohm resistor exceeding the rated value in each band.
14. **Noise generator**
   Use a noise generator whose output contains a high-frequency component of more than 1,300 MHz (near ignition noise).
15. **Sweep generator**
   Use a sweep generator that can sweep the 1,300 MHz band.
16. **Tracking generator**

Preparation

- Set controls to the position shown in Table 10 unless otherwise specified.

POWER SW	ON	CALL SW	OFF
AF VOL VR	MIN	BELL/ALERT	OFF
SQL VOL VR	MIN	TONE, SHIFT	OFF
VFO, MR/M	OFF	REW, STEP	OFF
VFO, MR/M	VFO	DRS	OFF

Table 10



(When viewed from the front of the set)

Fig. 32 Microphone Socket (on Front Panel)

- Use an insulated tool such as a plastic tool during adjustment (especially trimmer coil adjustment).
- For SSG protection, do not connect a microphone to the microphone socket during receiver block adjustment.
- Check that the power switch is off before the power cord is connected.
- The SSG output level is displayed at the release end.
- Check that the display and LCD display are as shown in Figure 33 after controls are set as in shown in Table 10.

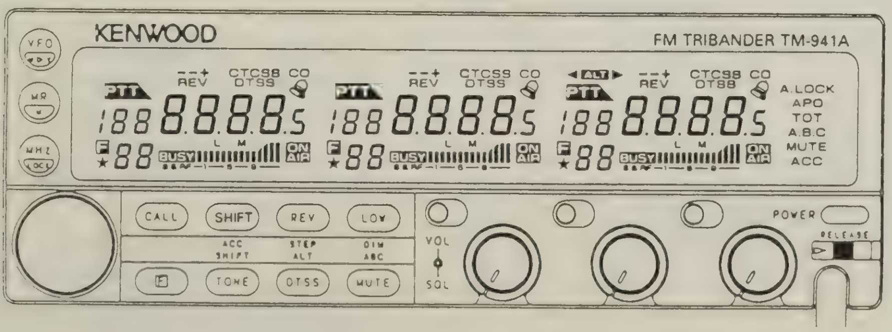


Fig. 33

ADJUSTMENT

Removing the TM-941A

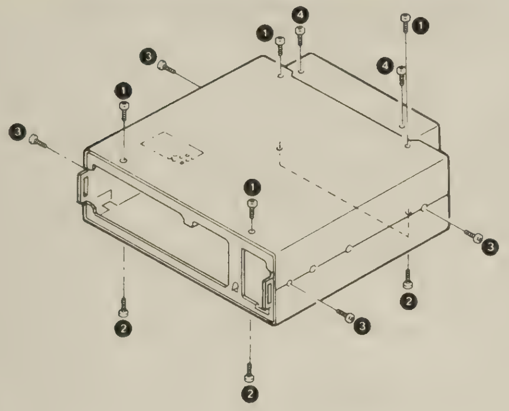


Fig. 34

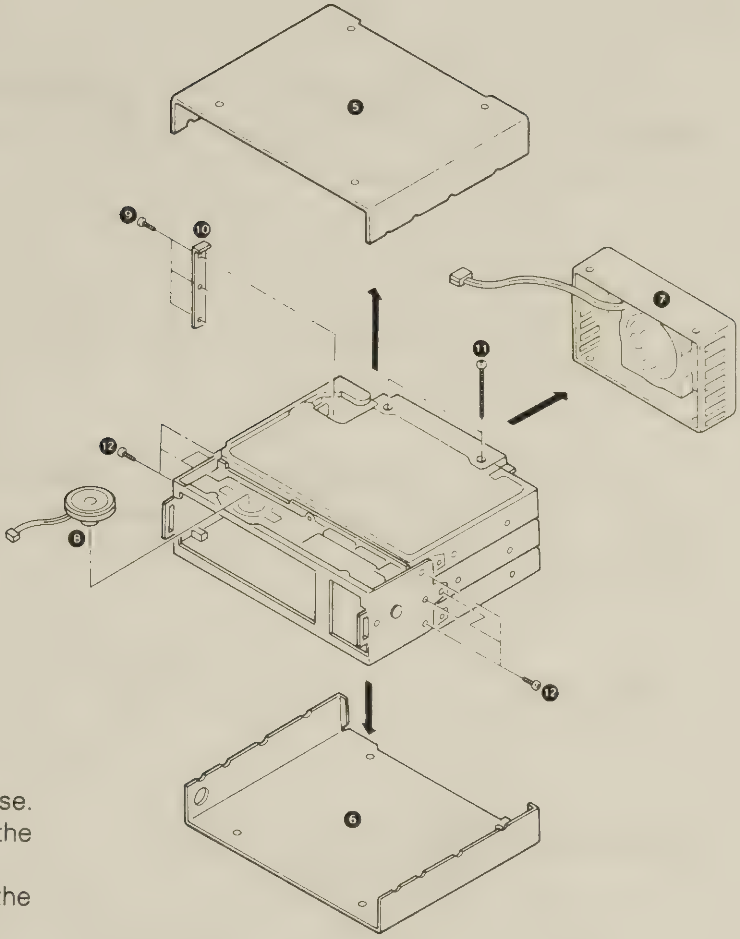


Fig. 35

1. Removing the case

1) Remove four screws ❶ in the top half of the case.
2) Remove four screws ❷ in the bottom half of the case.
3) Remove each two screws ❸ in each side of the case.
4) Remove the top half ❺ of the case in the direction of the arrow.
5) Remove the bottom half ❻ of the case in the direction of the arrow.
6) Unplug the speaker connector from the common unit so that the speaker leads will not break off.

2. Removing the fan

1) Remove the two upper and lower fan fixing screws. ❹
2) Unplug the power cord connector.
3) Pull the fan cover ❼ backward to remove it.

3. Removing the TX-RX units

1) Remove the three screws ❾ by inserting a screwdriver through the hole in the rear left of each TX-RX unit. Pull the power connector ❿ of each TX-RX unit upward to remove it.
2) Remove the two screws ⓫ holding the TX-RX units together.
3) Remove the four screws ⓬ right and left connectin the common unit and TX-RX units.
4) Fix the common unit ⓭ so it cannot move, then pull out the TX-RX unit ⓮, ⓯, ⓰ in the direction of the arrow.

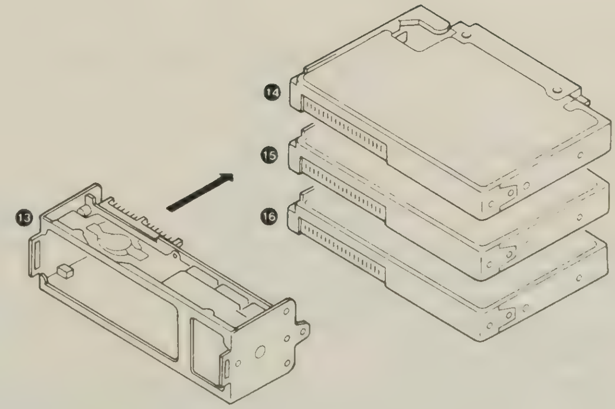


Fig. 36

ADJUSTMENT

- **144 MHz Band**

Common Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Lock voltage check	1. Frequency: 146.000 MHz Receive	Digital voltmeter					Check the lock voltage.	2.3 ~ 2.7V
	2. Frequency: 147.995 MHz Transmit	Digital voltmeter powermeter					Check the lock voltage.	3.4 ~ 4.1V
	3. Frequency: 144.000 MHz Receive	Digital voltmeter					Check the lock voltage.	2.0 V or more

The DC power supply must be set to the rated voltage.

Receiver Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Bandpass filter (BPF) adjustment	1. Frequency: 144.040 MHz SSG output: 0 dBμ Modulation: 1 KHz Deviation: 3 KHz Receive	Digital voltmeter SSG			TX-RX	L1-4	Adjust so that the voltmeter reading is maximum.	Voltmeter reading is maximum.
2. Receive sensitivity	1. Frequency: 144.040 MHz 145.940 MHz 147.940 MHz SSG output: 0.16μV (–10dBμ) Modulation: 1 KHz Deviation: 3 KHz	Distortion meter Millivoltmeter Oscilloscope SSG	Rear panel	EXT.SP			Check	12 dB SINAD or more
	2. AM sensitivity (K and P models only) Frequency: 118.040 MHz SSG output: 9μV (25dBμ) Modulation: 1 KHz Deviation: 30%						Press the MHz key and check that the frequency is set to 118.040 with an encoder.	12 dB SINAD or more
	Press the MR key							
3. Distortion factor	1. Frequency: 145.040 MHz SSG output: 52μV (40dBμ) Modulation: 1 KHz Deviation: 3 KHz AF output: 4 V/8 ohms	Distortion factor Oscilloscope SSG	Rear panel	EXT.SP	TX-RX	L6	Minimize the distortion factor.	5% or less
4. Signal strength meter adjustment	1. Frequency: 146.040 MHz SSG output: 6.3μV (22dBμ) Modulation: 1 KHz Deviation: 3 KHz	SSG			TX-RX	VR1	Adjust so that all LEDs go on, then one LED goes off.	
	2. SSG output: 6.8μV (23dBμ)						Adjust the SSG output so that all signal strength meter LEDs go on.	The SSG output is 20 ±6 dBμ.
5. Squelch check	1. Frequency: 146 040 MHz SSG output: Off Modulation: 1 KHz Deviation: 3 KHz	SSG	Rear panel	EXT.SP			1. Set the SQL knob to the closed position when the SSG output is off.	The SQL knob position is between 8 o'clock and 11 o'clock. The BUSY LED goes off.
	2. SSG output: 0.1μV (-14dBμ)							The squelch is open. The BUSY LED goes on.

ADJUSTMENT

Transmitter Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Power adjustment	1. Maximum power check Frequency: 146.000 MHz Transmit	Powermeter Ammeter	Rear panel	ANT	TX-RX	VR3	Check.	57 W or more
	2. High-power adjustment Frequency: 146.000 MHz Transmit				TX-RX	VR3	Adjust. 54W	48 to 59 W (11.5 A or less)
	3. Medium-power adjustment Note: This adjustment does not apply to the TM-941. Frequency: 146.000 MHz Transmit				TX-RX	VR4	Adjust. 12W	10 to 14 W
	4. Low-power check Frequency: 146.000 MHz Transmit						Check.	3 to 8 W
2. Deviation adjustment	1. Frequency: 146.000 MHz AG: 1 KHz, 50 mV Transmit	DC detector Oscilloscope	Rear panel	ANT	TX-RX	VR2	Adjust (in the higher + or - direction). 4.2 KHz	± 4.0 to 5.0 KHz
	2. Frequency: 146.000 MHz AG: 1 KHz, 5.0 mV Transmit						Check.	± 2.2 to 3.6 KHz
3. Tone check	1. Frequency: 145.220 MHz Tone: On Transmit	DC detector Oscilloscope	Rear panel	ANT			Check	± 0.5 to 1.5 KHz
4. Protection check	1. Frequency: 147.980 MHz Antenna: Open Transmit	Ammeter					Check	12.0 A or less
5. Frequency check	1. Frequency: 146.000 MHz Transmit	Frequency counter powermeter			TX-RX	TC1	146.000 MHz	± 100 Hz

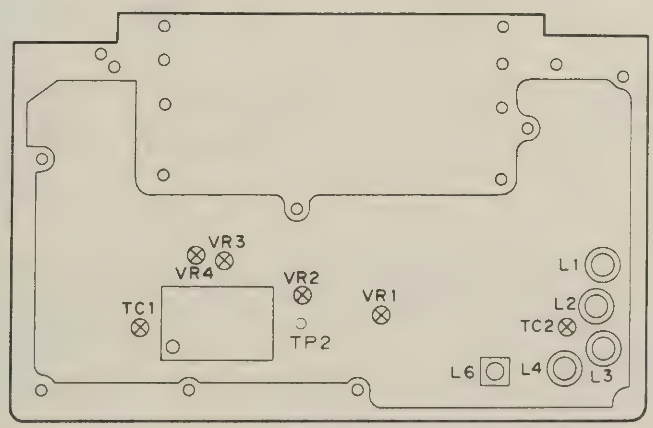
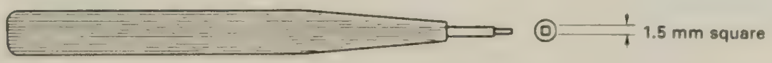


Fig. 37 144 MHz band adjustment: Component layout (upper view)

Note: Use an adjustment tool with a ceramic or plastic tip 1.5 mm square for L1 through L4.



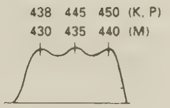
ADJUSTMENT

• 430 MHz Band

Common Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Lock voltage check	1. Frequency: 440.000 MHz (K and P models) 430.000 MHz (M model) Receive	Digital voltmeter					Check the lock voltage.	3.9 ~ 4.9V
	2. Frequency: 440.000 MHz (K and P models) 430.000 MHz (M model) Transmit	Digital voltmeter powermeter					Check the lock voltage.	2.0 ~ 3.0V
	3. Frequency: 449.975 MHz (K and P models) 439.975 MHz (M model)	Digital voltmeter					Check the lock voltage.	4.4 ~ 5.6V

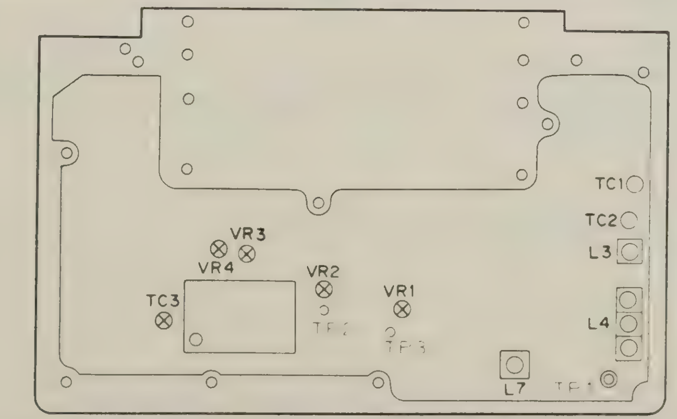
Receiver Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Helical scanning adjustment	1. Frequency: 445.050 MHz (K and P models) 435.050 MHz (M model) Spectrum analyzer: Center of above frequency Tracking generator: Output: –30 dBm	Digital voltmeter Spectrum analyzer Tracking generator			TX-RX	TC1, TC2, L3, L4X3	 Adjust each frequency as shown in the figure.	
2. Receive sensitivity	1. Frequency: 445.050 MHz (K and P models) 435.050 MHz (M model) SSG output: 0.18µV (–9 dBµ) Modulation: 1 KHz Deviation: 3 KHz	Distortion meter Millivoltmeter Oscilloscope SSG	Rear panel	EXT.SP			Check.	12 dB SINAD or more
3. Distortion factor	1. Frequency: 445.050 MHz (K and P models) 435.050 MHz (M model) SSG output: 52µV (40 dBµ) Modulation: 1 KHz Deviation: 3 KHz AF output: 4 V/8 ohms	Distortion meter Oscilloscope SSG	Rear panel	EXT.SP	TX-RX	L7	Minimize the distortion factor.	5% or less
4. Signal strength meter adjustment (check)	1. Frequency: 445.050 MHz (K and P models) 435.050 MHz (M model) SSG output: 6.8µV (23 dBµ) Modulation: 1 KHz Deviation: 3 KHz	SSG			TX-RX	VR1		Adjust so that all LEDs go on, then one LED goes off.
	2. SSG output: 8.3µV (24 dBµ)						Adjust the SSG output so that all signal strength meter LEDs go on.	The SSG output is 20 ±6 dBµ.
5. Squelch check	1. Frequency: 445.050 MHz (K and P models) 435.050 MHz (M model) SSG output: Off Modulation: 1 KHz Deviation: 3 KHz	SSG	Rear panel	EXT.SP			1. Set the SQL knob to the closed position when the SSG output is off.	The knob position is between 8 o'clock and 11 o'clock. The BUSY LED goes off.
	2. SSG output: 0.1µV (–14 dBu)							The squelch is open. The BUSY LED goes on.

ADJUSTMENT

Transmitter Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Power adjustment	1. Maximum power check Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) Transmit	Powermeter Ammeter	Rear panel	ANT	TX-RX	VR3	Check.	38 W or more
	2. High-power adjustment Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) Transmit				TX-RX	VR3	Adjust. 37W	33 to 42 W (10 A or less)
	3. Medium-power adjustment Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) Transmit				TX-RX	VR4	Adjust. 13W	10 to 14 W
	4. Low-power check Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) Transmit						Check.	3 to 8 W
2. Deviation adjustment	1. Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) AG: 1 KHz, 50 mV Transmit	DC detector Oscilloscope	Rear panel	ANT	TX-RX	VR2	Adjust (in the higher + or - direction). 4.2 KHz	± 4.0 to 5.0 KHz
	2. Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) AG: 1 KHz, 5.0 mV Transmit						Check.	± 2.2 to 3.6 KHz
3. Tone check	1. Frequency: 438.200 MHz Tone: On Transmit	DC detector Oscilloscope	Rear panel	ANT			Check.	± 0.5 to 1.5 KHz
4. Protection check	1. Frequency: 449.980 MHz (K and P models) 439.980 MHz (M model) Antenna: Open Transmit	Ammeter					Check.	10 A or less
5. Frequency check	1. Frequency: 445.000 MHz (K and P models) 435.000 MHz (M model) Transmit	Frequency counter powermeter			TX-RX	~~TC1~~ TC3	445.000 MHz K, P 435.000 MHz M	± 100 Hz



To adjust the 430 MHz band, remove the 144 MHz band unit from the control unit.

Fig. 38 430 MHz band adjustment: Component layout (upper view)

ADJUSTMENT

● 1200 MHz Band

Common Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Lock voltage check	1. Frequency: 1270.000 MHz Receive	Digital voltmeter					Check the lock voltage.	6.5 ~ 7.5V
	2. Frequency: 1299.975 MHz Transmit	Digital voltmeter Wattmeter					Check the lock voltage.	6.0 ~ 7.0V
	3. Frequency: 1240.000 MHz Receive	Digital voltmeter					Check the lock voltage.	1.2 V or more

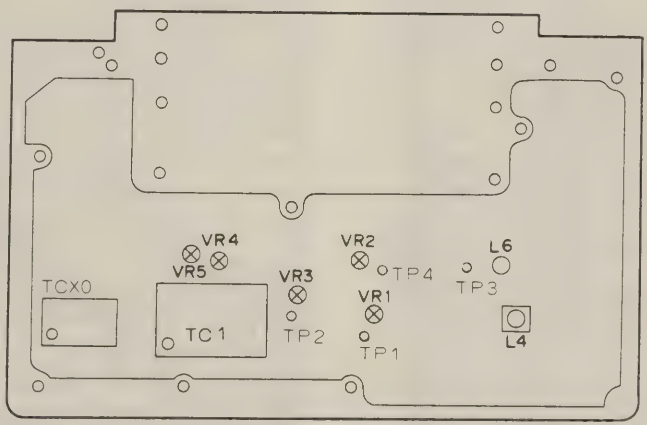
Receiver Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. ALT adjustment	1. Frequency: 1270.100 MHz	Digital voltmeter SSG					Check the voltage.	AV
	2. The same as the above frequency. SSG: Off				TX-RX	VR2	Adjust so that the voltage is 0.1 V higher than above.	AV + 0.1V
	3. The same as the above frequency. SSG output: 0.5μV (0 dBμ) Modulation: 1 KHz Deviation: 3 KHz				TX-RX	L6	Check that the voltage is 0.3 V higher than above when ALT is on, then turn ALT off.	(A + 0.1) V + 0.3V
2. Receive sensitivity	1. Frequency: 1270.100 MHz SSG output: 0.19μV (–8.5 dBμ) Modulation: 1 KHz Deviation: 3 KHz	Distortion meter Millivoltmeter Oscilloscope SSG	Rear panel	EXT.SP			Check.	12 dB SINAD or more
3. Distortion adjustment	1. Frequency: 1270.100 MHz SSG output: 52μV (40 dBμ) Modulation: 1 KHz Deviation: 3 KHz AF output: 4 V/8 ohms	Distortion meter Oscilloscope SSG	Rear panel	EXT.SP	TX-RX	L4	Minimize the distortion factor.	5% or less
4. Signal strength meter adjustment (check)	1. Frequency: 1270.100 MHz SSG output: 8μV (24 dBμ) Modulation: 1 KHz Deviation: 3 KHz	SSG			TX-RX	VR1		Adjust so that all LEDs go on, then one LED goes off.
	2. SSG output: 9μV (25 dBμ)						Adjust the SSG output so that all signal strength meter LEDs go on.	The SSG output is 20 ±6 dBμ.
5. Squelch check	1. Frequency: 1270.100 MHz SSG output: Off Modulation: 1 KHz Deviation: 3 KHz	SSG	Rear panel	EXT.SP			1. Set the SQL knob to the closed position when the SSG output is off.	The knob position is between 8 o'clock and 11 o'clock. The BUSY LED goes off.
	2. SSG output: 0.1μ V (–14 dBμ)						Check	The squelch is open. The BUSY LED goes on.

ADJUSTMENT

Transmitter Section Adjustment

Item	Condition	Measurement point			Adjustment point			Specification
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Power adjustment	1. Maximum power check Frequency: 1270.000 MHz Transmit	Powermeter Ammeter	Rear panel	ANT	TX-RX	VR4	Check.	11 W or more
	2. High-power adjustment Frequency: 1270.000 MHz Transmit				TX-RX	VR4	Adjust. 10W The fan runs when the PTT switch is pressed. (It continues for a while after the PTT switch is released, then stops.)	9 to 14 W (6.0 A or less)
	3. Low-power check Frequency: 1270.000 MHz Transmit				TX-RX	VR5	Check.	0.7 to 1.4 W
2. Deviation adjustment	1. Frequency: 1270.000 MHz AG: 1 KHz, 50 mV Transmit	DC detector Oscilloscope	Rear panel	ANT	TX-RX	VR3	Adjust (in the higher + or – direction). 4.2KHz	± 4.0 to 5.0 KHz
	2. Frequency: 1270.000 MHz AG: 1 KHz, 5.0 mV Transmit						Check.	± 2.2 to 3.6 KHz
3. Tone check	1. Frequency: 1282.200 MHz Tone: On Transmit	DC detector Oscilloscope	Rear panel	ANT			Check.	± 0.5 to 1.5 KHz
4. Protection check	1. TM-941 Frequency: 1240.000 MHz 1270.000 MHz 1299.980 MHz Antenna: Open Transmit	Ammeter					Check.	8.5 A or less
5. Frequency check	1. Frequency: 1270.000 MHz Transmit	Frequency counter Powermeter					1270.000 MHz	± 1KHz



To adjust the 1200 MHz band, remove 144 and 430 MHz band units from the control unit and install a 1200 MHz band unit in the 430 MHz band position (center section). Supply the power with a power cord with alligator clips. Make sure there is no short circuit between the clips and the case.

Fig. 39 1200 MHz band adjustment: Component layout (upper view)

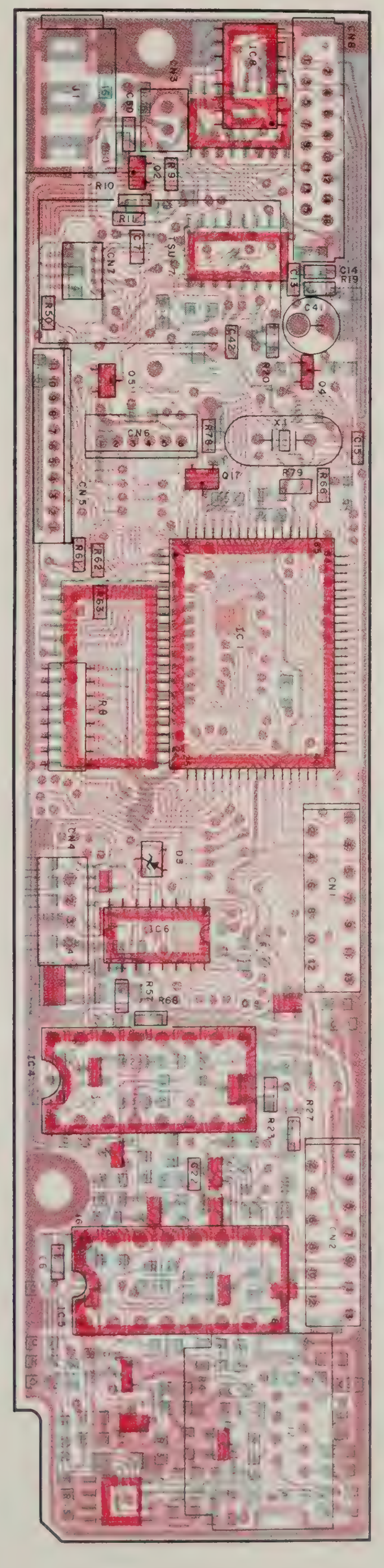
TM-941A

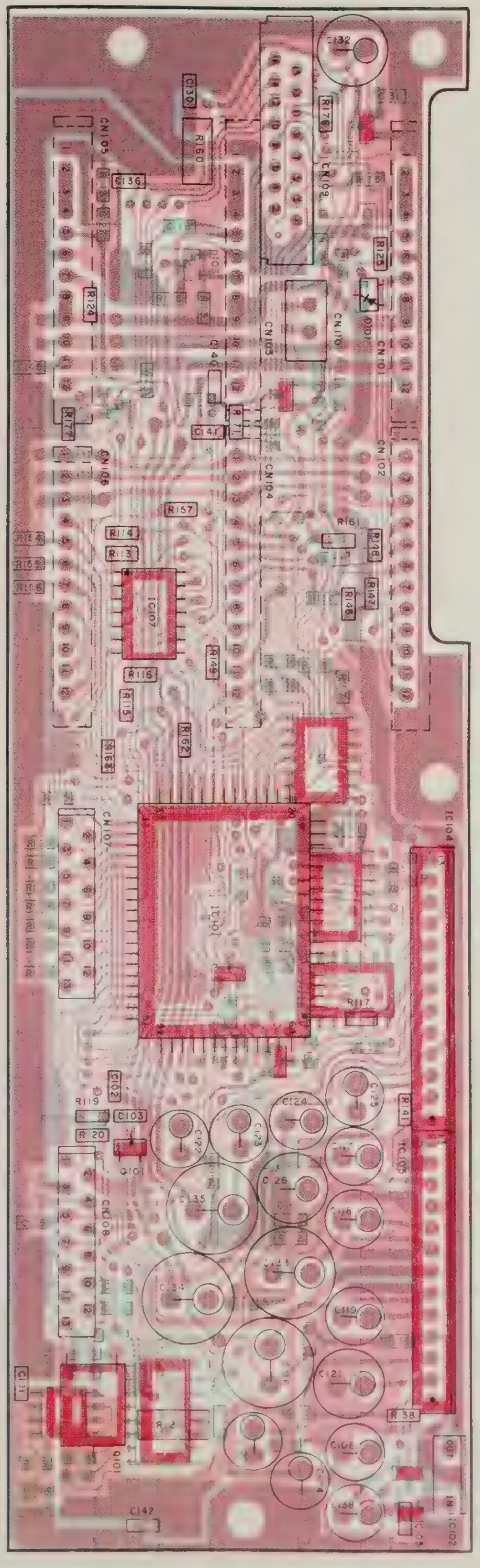
PC BOARD VIEW

CONTROL UNIT (X53-3310-11)

Component side view

IC1:75516GF-189-3B9 IC2:LC3564PML-12, 15 IC3:TA78L06F IC4, 5:TC9154AP IC6, 7:BU4094BF IC8, 9:BU4053BF IC10:NJM4558E IC11, 12:TC4S11F
Q1:2SC3324 (G) Q2, 4~8, 17:2SC2712(Y) Q3,9~11:DTC114EK Q12~15:2SD175 (K) Q16:2SA1519
D1:1SS184 D2, 4, 6:LFB01 D3:02CZ7.5(X) D5:02CZ3.0(Z)





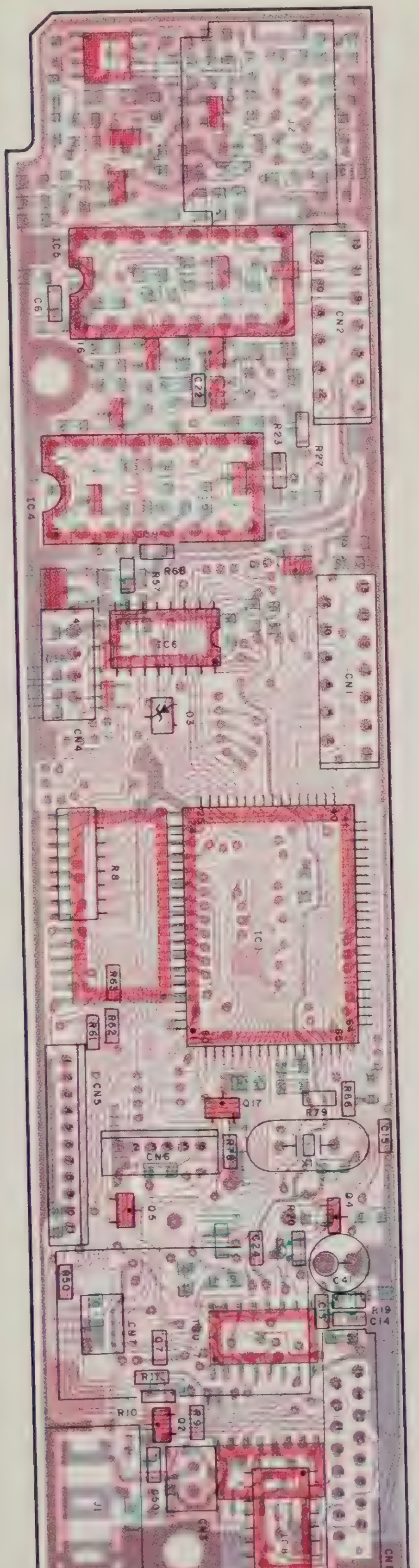
IC101:CXD1095Q IC102:MC78T08CT IC103:NJM4558E IC104,105:LA4446 IC106:BU4053BF IC107~110:BU4066BF
Q101,107:2SC2712(Y) Q102:2SA1641(S, T) Q103:DTD143EK Q104,105:DTC114EK Q106:DTC144EK Q108:DTA144EK
D101~103:1SS184

🟥 : Component side pattern ⬜ : Foil side pattern

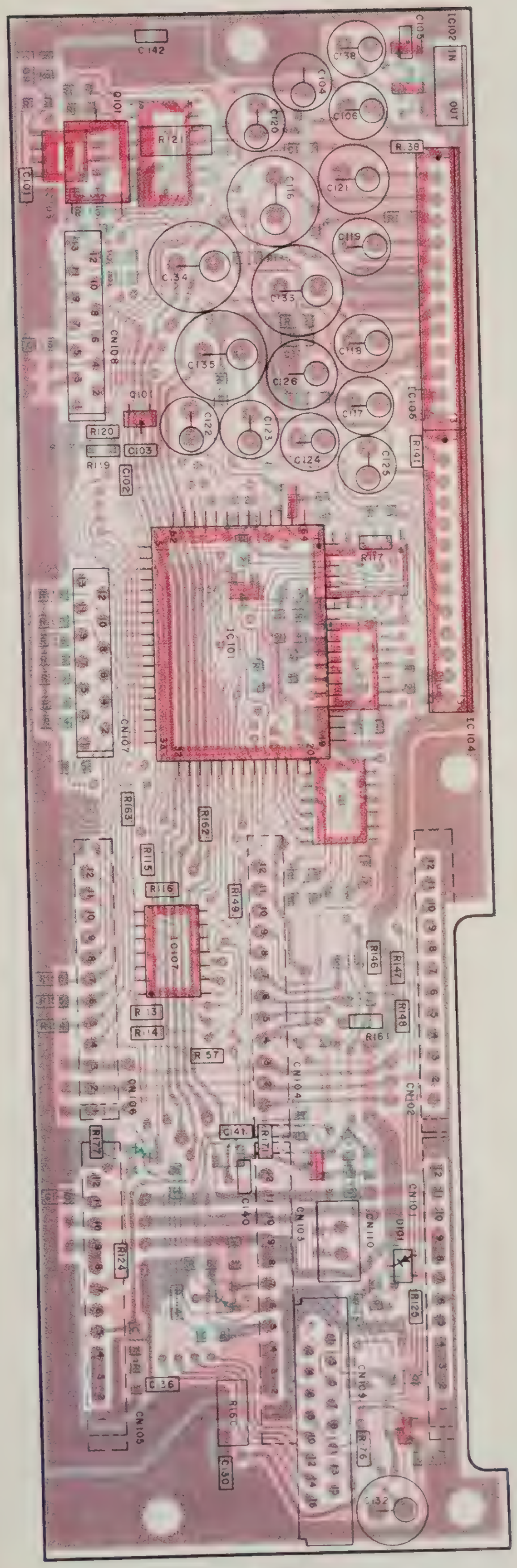
PC BOARD VIEW

CONTROL UNIT (X53-3310-11)

Foil side view



IC1:75516GF-189-3B9 IC2:LC3564PML-12,15 IC3:TA78L06F IC4, 5:TC9154AP IC6, 7:BU4094BF IC8, 9:BU4053BF IC10:NJM4558E IC11, 12:TC4S11F
Q1:2SC3324(G) Q2, 4~8, 17:2SC2712(Y) Q3, 9~11:DTC114EK Q12~15:2SD1757(K) Q16:2SA1519
D1:1SS184 D2, 4, 6:LFB01 D3:02CZ7.5(X) D5:02DZ3.0(Z)



IC101:CXD1095Q IC102:MC78T08CT IC103:NJM4558E IC104, 105:LA4446 IC106:BU4053BF IC107~110:BU4066BF
Q101, 107:2SC2712(Y) Q102:2SA1641(S. T) Q103:DTD143EK Q104, 105:DTC114EK Q106:DTC144EK Q108:DTA144EK
D101~103:1SS184

🟥 : Component side pattern ▨ : Foil side pattern

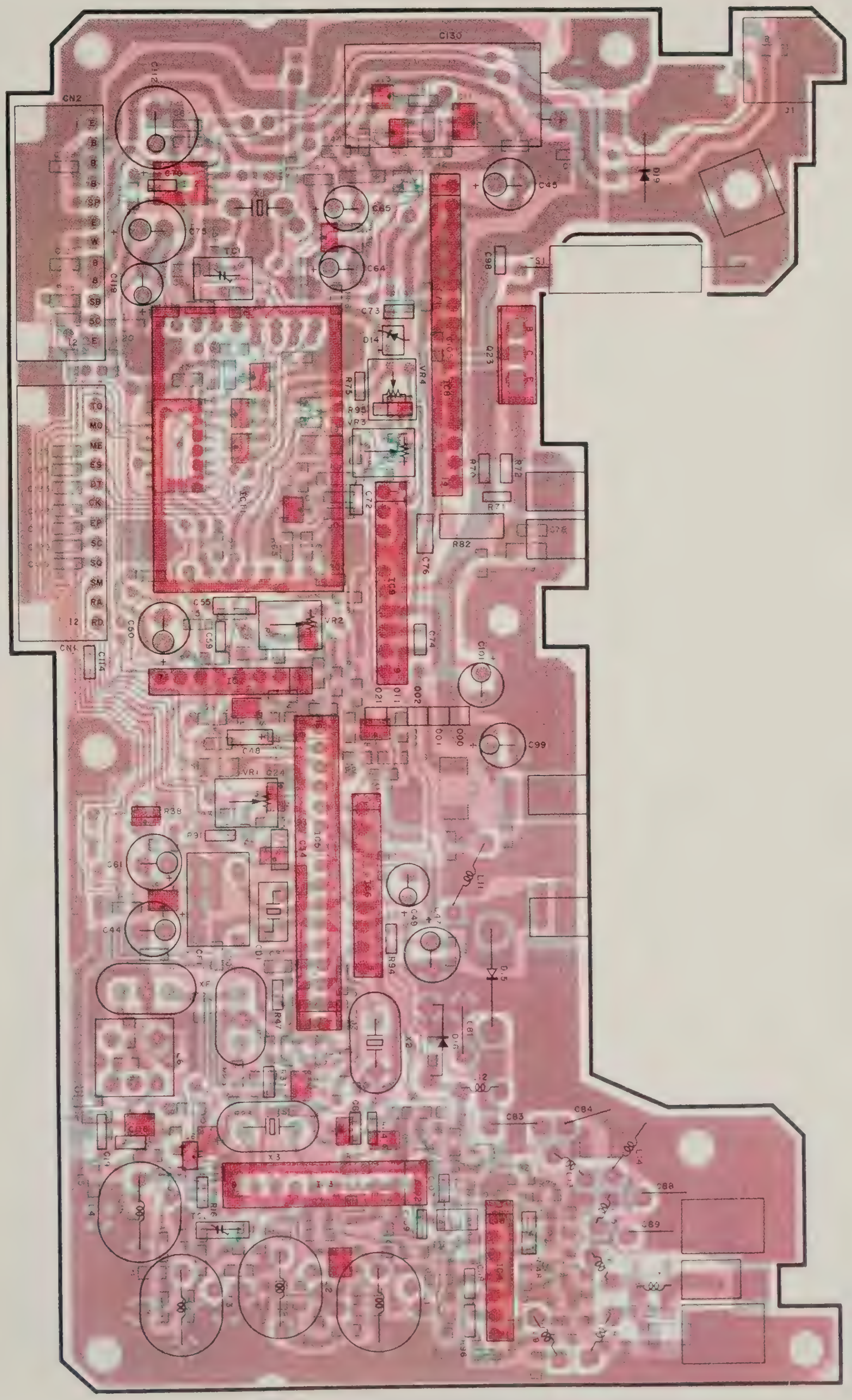
TM-941A

PC BOARD VIEW

144MHz TX-RX UNIT (X57-3580-XX)

Component side view

IC1:BU4094BF IC2:LA5010M IC5:KCD04 IC6:KCD05 IC7:KCA04 IC8:KCB11 IC9:KCC04 IC10:S-AV17 IC11:KCH05
Q1:3KS184(S) Q2:3SK179(L) Q3, 20:2SC2714(Y) Q4:DTA114YK Q5, 6:DTC123JK Q7:DTC143EK Q10:2SA1362(Y) Q11:2SB1119S Q12:DTC144WK
Q13, 14, 21:2SC2712(Y) Q15~17:DTC144EK Q18:2SD1757(K) Q19:2SK208(Y) Q22:FMG1 Q23:2SD1902R Q24:2SJ106(GR)
D1, 3, 4, 6:1SV164 D2, 5, 7:1SV166 D11, 12:1SS184 D13:DAN235(K) D14:1SS181 D15:MI407 D16:MI308 D17, 18:1SS226 D19:DSA3A1



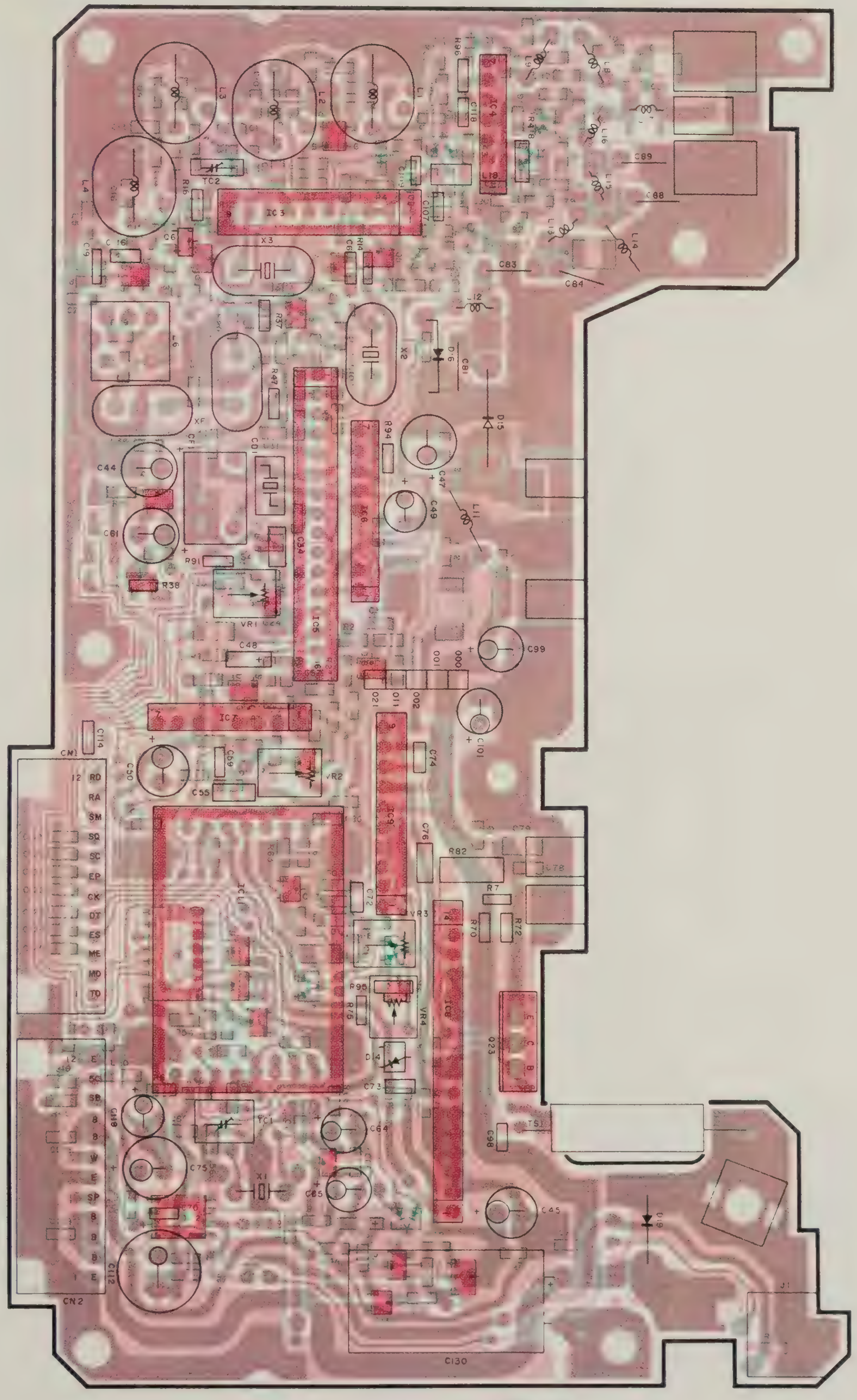
🟥 : Component side pattern ▨ : Foil side pattern

PC BOARD VIEW

144MHz TX-RX UNIT (X57-3580-XX)

Foil side view

IC1:BU4094BF IC2:LA5010M IC5:KCD04 IC6:KCD05 IC7:KCA04 IC8:KCB11 IC9:KCC04 IC10:S-AV17 IC11:KCH05
Q1:3SK184(S) Q2:3SK179(L) Q3, 20:2SC2714(Y) Q4:DTA114YK Q5, 6:DTC123JK Q7:DTC143EK Q10:2SA1362(Y) Q11:2SB1119S Q12:DTC144WK
Q13, 14, 21:2SC2712(Y) Q15~17:DTC144EK Q18:2SD1757(K) Q19:2SK208(Y) Q22:FMG1 Q23:2SD1902R Q24:2SJ106(GR)
D1, 3, 4, 6:1SV164 D2, 5, 7:1SV166 D11, 12:1SS184 D13:DAN235(K) D14:1SS81 D15:MI407 D16: MI308 D17, 18:1SS226 D19:DSA3A1



: Component side pattern : Foil side pattern

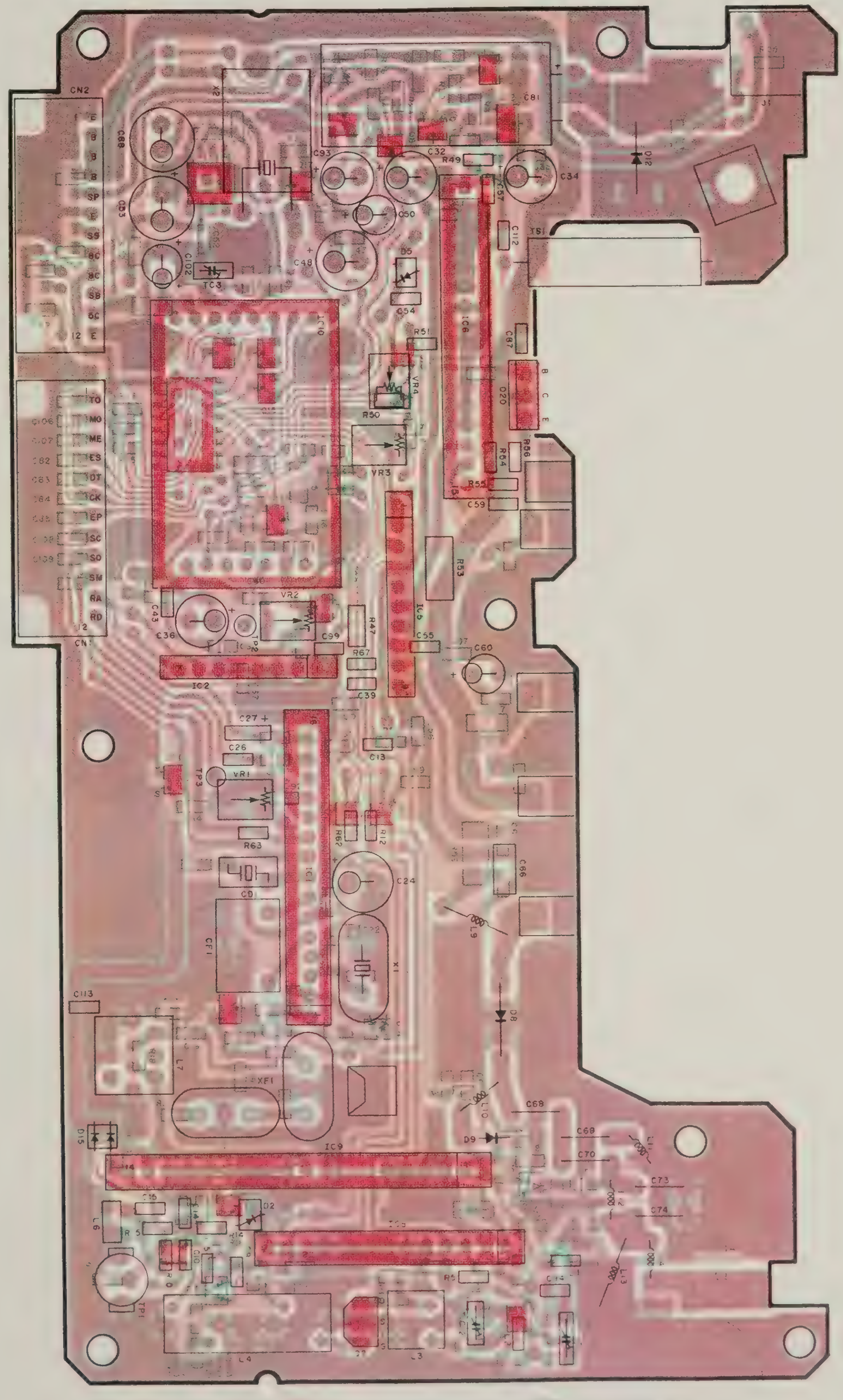
TM-941A

PC BOARD VIEW

430MHz TX-RX UNIT (X57-3590-XX)

Component side view

IC1:KCD04 IC2: KCA04 IC3:BU4094BF IC4:LA5010M IC5:KCC04 IC6:KCB14 IC7:M57788M IC10:KCH07
Q1,3:3SK184(S) Q2:2SK582 Q5:2SC2714(Y) Q8:2SA1362(Y) Q9:DTC144WK Q10,11,17:2SC2712(Y) Q12:2SB1119S Q13-15:DTC144EK
Q16:2SD1757(K) Q18:2SC3123 Q19:FMG1 Q20:2SD1760(Q) Q21:2SJ106(GR)
D1:HSK277 D4,15:MA862 D5:1SS181 D6, 7, 13:1SS184 D8:MI407 D9:MI808 D10,11,14:MA716 D12:DSA3A1



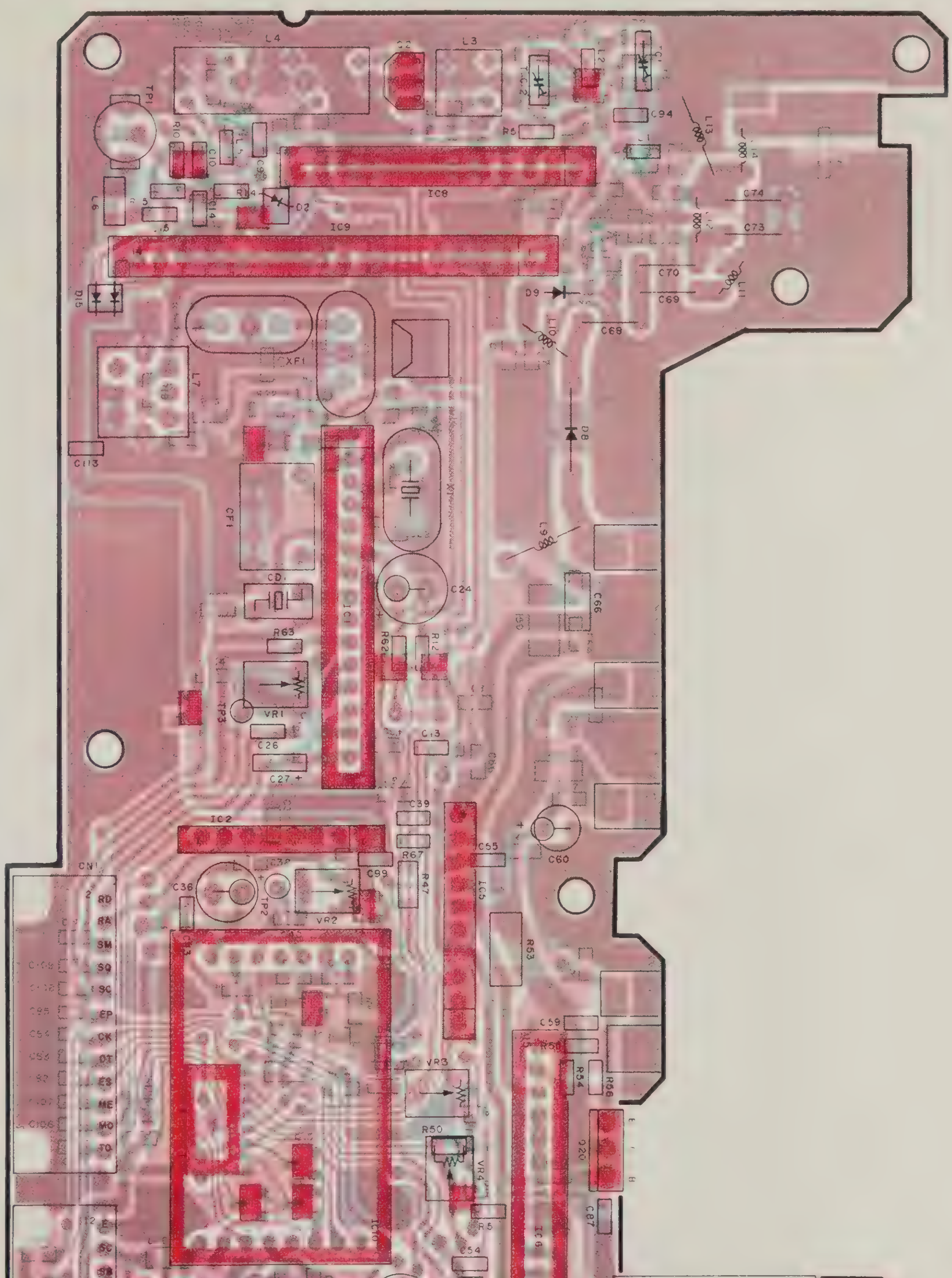
🟥 : Component side pattern ⬜ : Foil side pattern

PC BOARD VIEW

430MHz TX-RX UNIT (X57-3590-XX)

Foil side view

IC1:KCD04 IC2: KCA04 IC3:BU4094BF IC4:LA5010M IC5:KCC04 IC6:KCB14 IC7:M57788M IC10:KCH07
Q1,3:3SK184(S) Q2:2SK582 Q5:2SC2714(Y) Q8:2SA1362(Y) Q9:DTC144WK Q10,11,17:2SC2712(Y) Q12:2SB1119S Q13-15:DTC144EK
Q16:2SD1757(K) Q18:2SC3123 Q19:FMG1 Q20:2SD1760(Q) Q21:2SJ106(GR)
D1:HSK277 D4,15:MA862 D5:1SS181 D6, 7, 13:1SS184 D8:MI407 D9:MI808 D10,11,14:MA716 D12:DSA3A1



▨ : Component side pattern ▨ : Foil side pattern

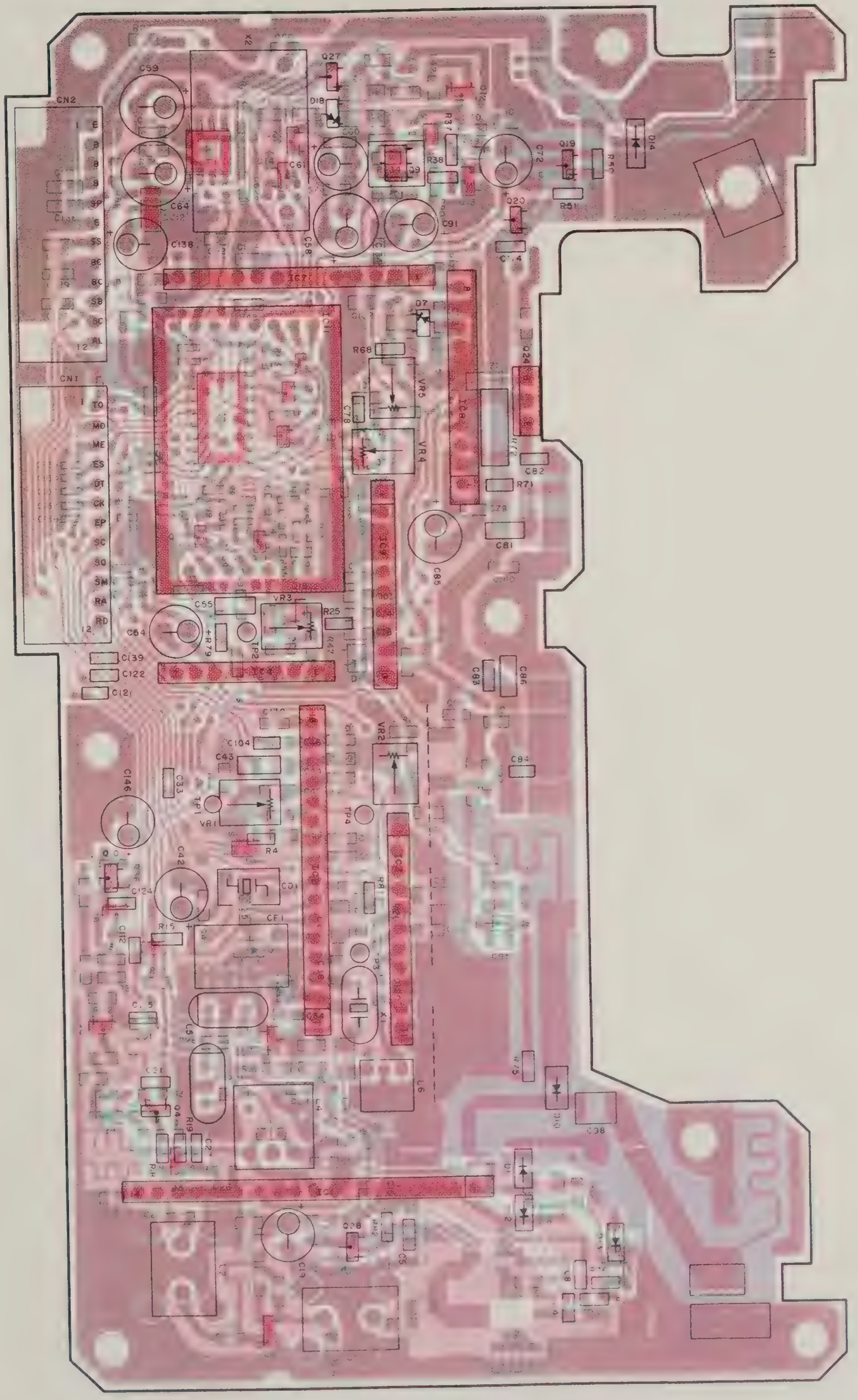
TM-941A

PC BOARD VIEW

1200MHz TX-RX UNIT (X57-3600-11)

Component side view

IC2:KCD04 IC3:KCX03 IC4:KCA04 IC5:BU4094BF IC6:LA5009M IC7:KCB09 IC8:KCB10 IC9:KCC04 IC10:M67711 IC11:KCH03 IC12:NUM78L05UA
Q1:MGF1502 Q2:2SC4095(R47,6) Q3:3SK184(S) Q6:2SC3356 Q7:2SC3120 Q8,19:2SA1362(Y) Q9:2SB1302S Q10:DTC144WK
Q11:FMW1 Q12, 13, 23:2SC2712(Y) Q15~17:DTC144EU Q18:2SD1757(K) Q20:STC124EK Q21,22:2SC4226(R23, 24)
Q24:2SD1760(Q) Q25:FMG1 Q26:2SJ106(GR) Q28:DTC114EK
D1:MA862 D3:MA716 D4,6:1SS193 D5:02CZ6.2(X, Y) D7,18:1SS187 D8:02CZ12(X, Y) D9:HSK151 D10~13:MI808 D14:DSA3A1 D15:02CZ3.6(Y, Z)
D17:DAP202U

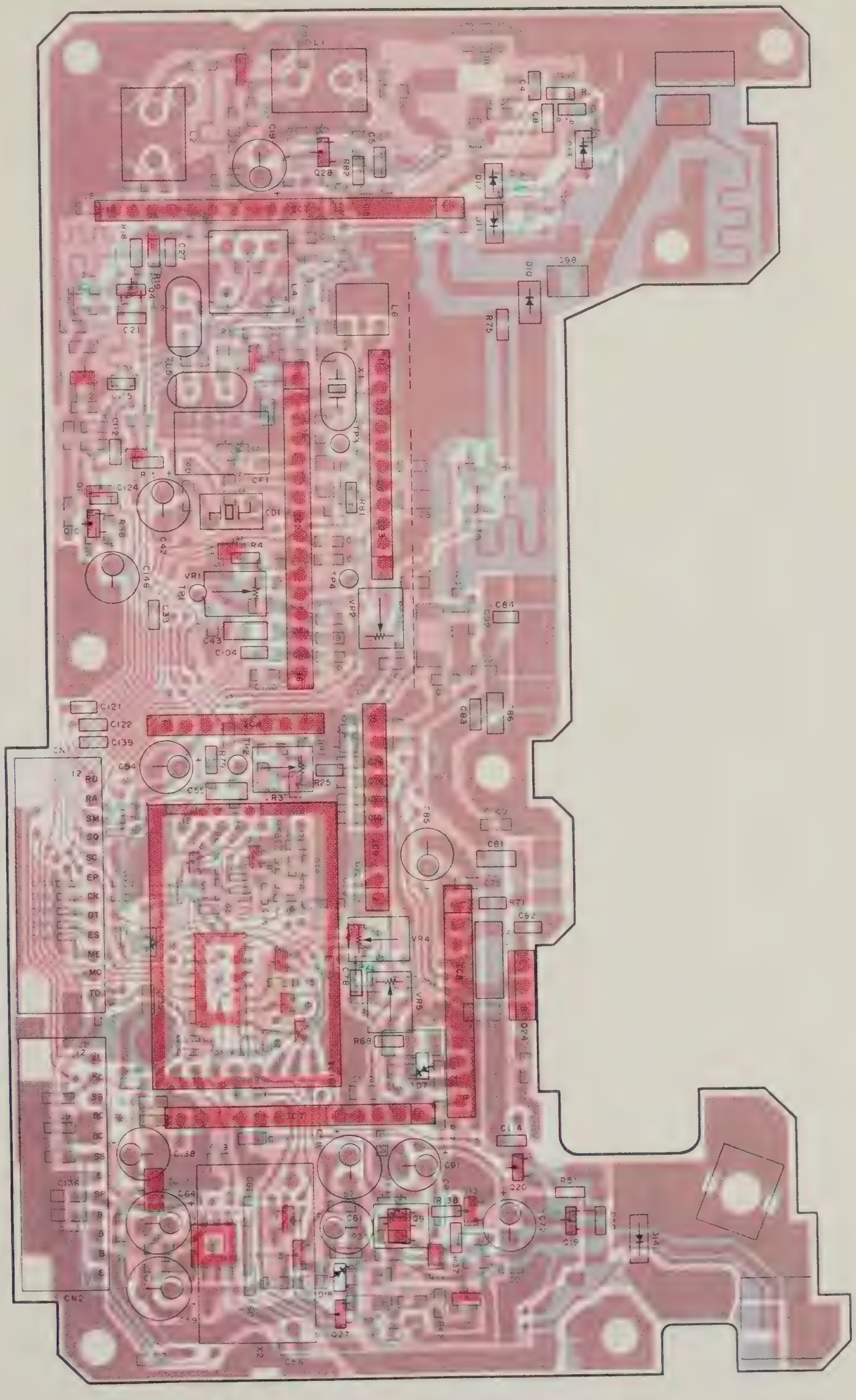


▨ : Component side pattern ▨ : Foil side pattern

1200MHz TX-RX UNIT (X57-3600-11)

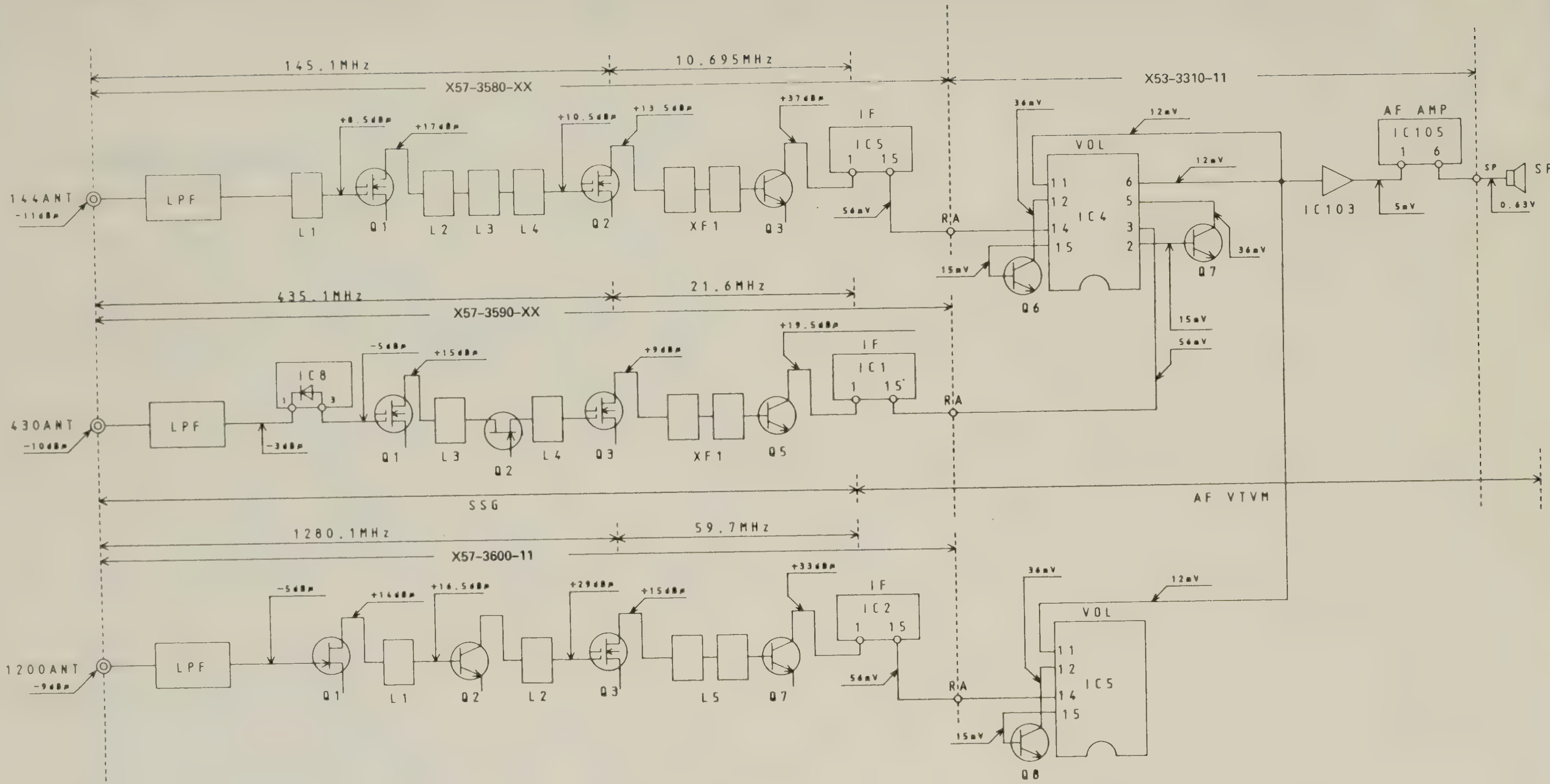
Foil side view

IC2:KCD04 IC3:KCX03 IC4:KCA04 IC5:BU4094BF IC6:LA5009M IC7:KCB09 IC8:KCB10 IC9:KCC04 IC10:M67711 IC11:KCH03 IC12:NJM78L05UA
Q1:MGF1502 Q2:2SC4095(R47,6) Q3:3SK184(S) Q6:2SC3356 Q7:2SC3120 Q8,19:2SA1362(Y) Q9:2SB1302S Q10:DTC144WK
Q11:FMW1 Q12, 13, 23:2SC2712(Y) Q28:DTC114EK Q15~17:DTC144EU Q18:2SD1757(K) Q20:DTC124EK Q21,22:2SC4226(R23, 24)
Q24:2SD1760(Q) Q25:FMG1 Q26:2SJ106(GR) Q28:DTC114EK
D1:MA862 D3:MA716 D4,6:1SS193 D5:02CZ6.2(X, Y) D7:1SS187 D8:02CZ12(X, Y) D9:HSK151 D10~13:MI808 D14:DSA3A1 D15:02CZ3.6(Y, Z)
D17:DAP202U



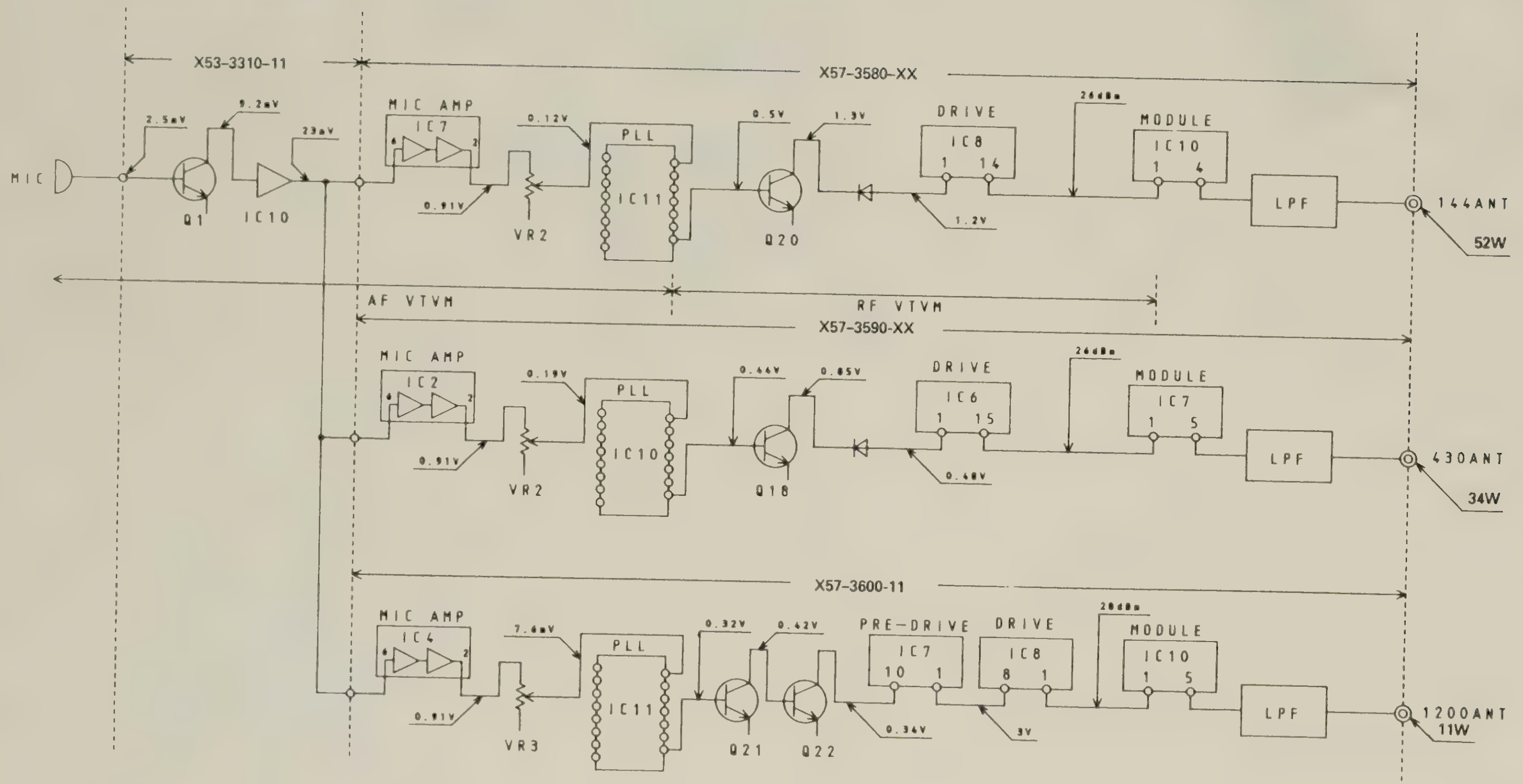
🟥 : Component side pattern ▨ : Foil side pattern

Receiver section



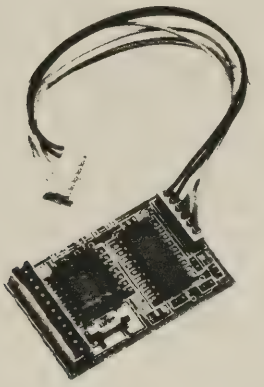
1. SG input level for which a 12dB SINAD are obtained. Measured by connecting the SG to each point via a 0.01μF capacitor.
2. AF level obtained when the AF output level is adjusted for 0.63V/8Ω with the front panel AF VOL control. Measure with AF voltmeter connected to the speaker jack, receiving a 40dB EMF SSG signal modulated at 1KHz, DEV 3KHz.

Transmitter section:



1. AG is set so that MIC input becomes 3kHz DEV at 1kHz MOD.
2. Transmitting frequency; 145.0MHz, 435.0MHz. 1280MHz.
3. HI/MID/LOW SW: HI
4. APC SW: OFF

DTU-2 EXTERNAL VIEW



DTU-2 PARTS LIST

* NEW PARTS

Ref. No.	New parts	Parts No.	Description
C1		CK73FB1E104K	Chip C 0.1μF K
C2		CC73GCH1H100D	Chip C 10pF D
C3, 4		CC73GCH1H330J	Chip C 33pF J
C5~8, 10		CK73GB1E103K	Chip C 0.01μF K
C13~16		CK73GB1E103K	Chip C 0.01μF K
C9		CK73GB1E822K	Chip C 0.0082μF K
C10		CK73GB1E322K	Chip C 0.0033μF K
C11		CC73GSL1H101J	Chip C 100pF J
		E37-0033-05	Connecting cable (6P)
		E40-5188-05	Pin ass'y socket (11P)
X1		L78-0061-05	CERAMIC RESONATOR (3.58MHz)
R1~14		RK73GB1JxxxJ	Chip R
Q1		DTC114EU	Digital transistor
Q2, 3		2SC4116 (Y)	Digital transistor
IC1		TP5088WM	IC
IC2		LC7385M	IC
IC3		BU4066BF	IC

DTU-2 (DTMF U

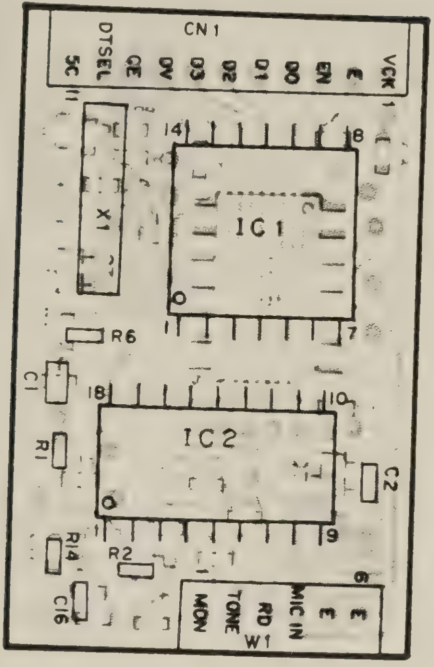
DTU-

DTU-

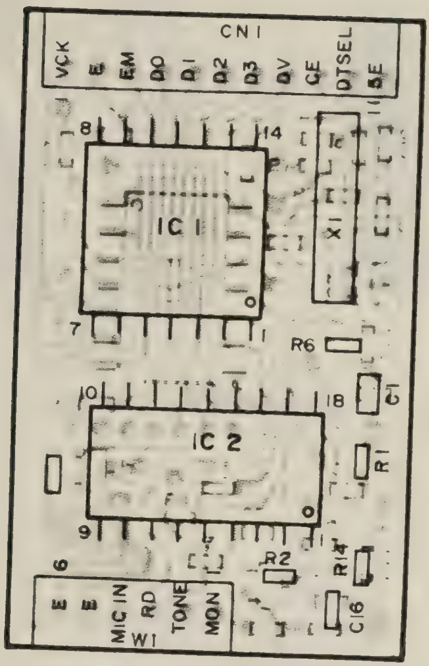
2 (DTMF UNIT)

DTU-2 PC BOARD VIEWS

Componet side view



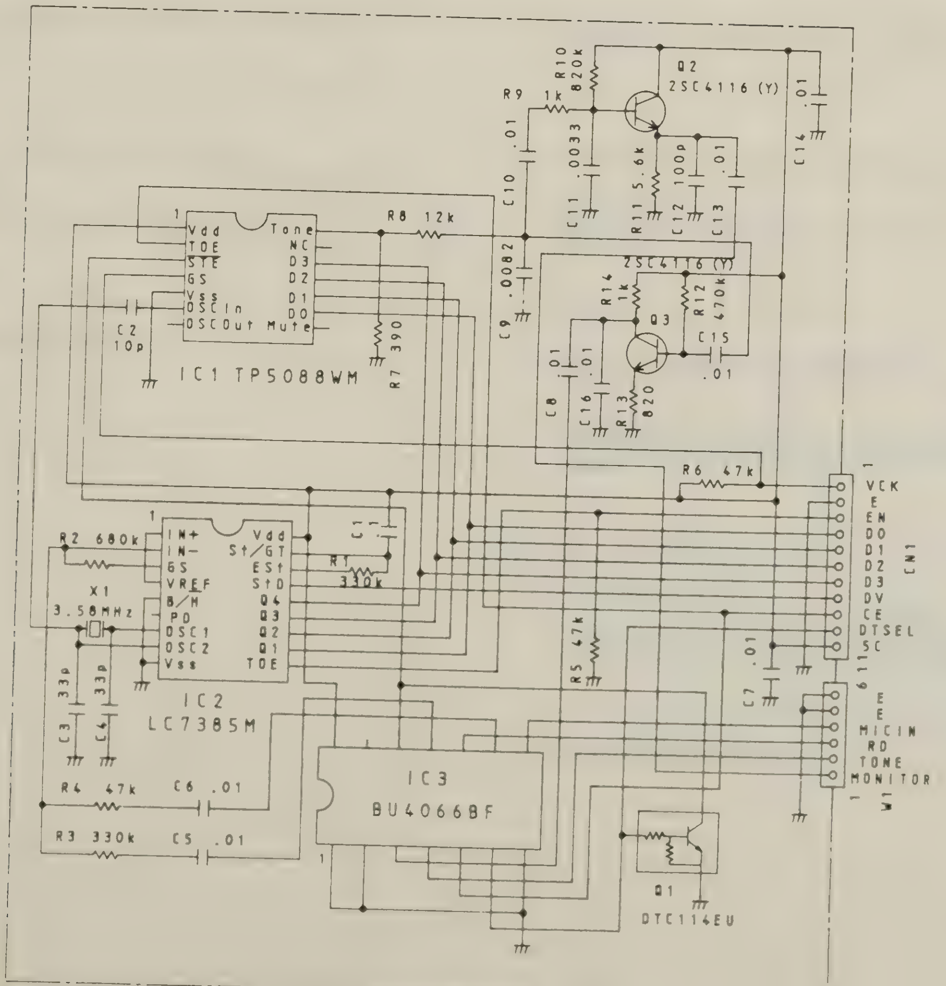
Foil side view



Component side

Foil side

DTU-2 CIRCUIT DIAGRAM

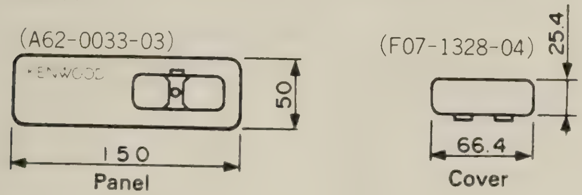


PG-4K/L (PANEL SEPARATE KIT K:4M, L:7M)

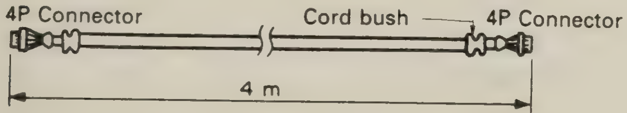
PG-4K EXTERNAL VIEW

PG-4K MAIN EXTERNAL DIMENSIONS

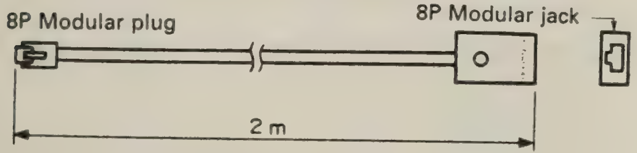
- **Panel**



- **Panel cable (E30-3012-05)**

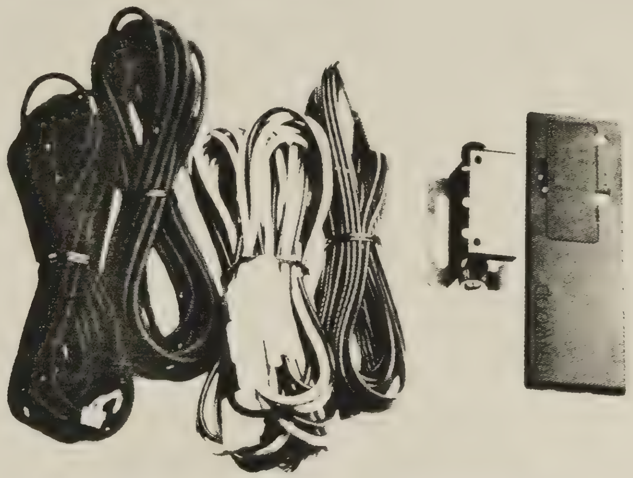


- **Microphone cable (E30-3013-05)**



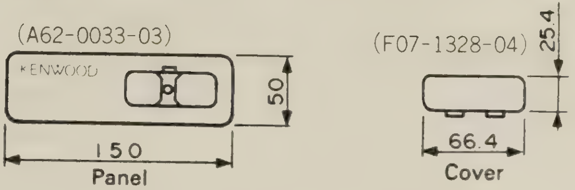
- **Screw set (N99-0347-05)**

PG-4L EXTERNAL VIEW

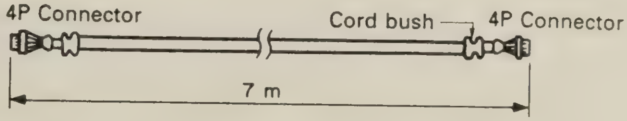


PG-4L MAIN EXTERNAL DIMENSIONS

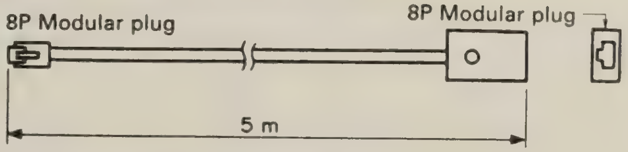
- **Panel**



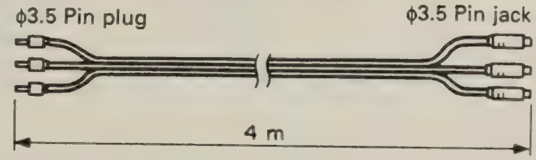
- **Panel cable (E30-3014-05)**



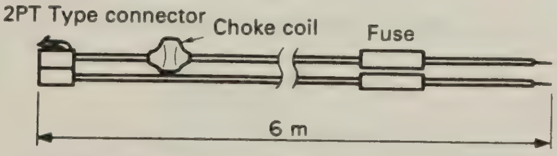
- **Microphone cable (E30-3015-05)**



- **Speaker cable (E30-3016-05)**



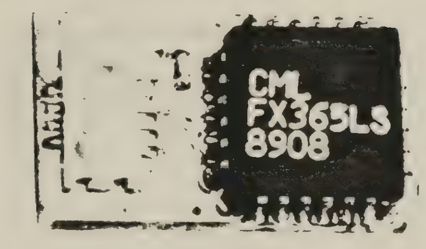
- **DC cord (E30-3032-05)**



- **DC cord (N99-0347-05)**

TSU-7 (CTCSS UNIT)

TSU-7 EXTERNAL VIEW



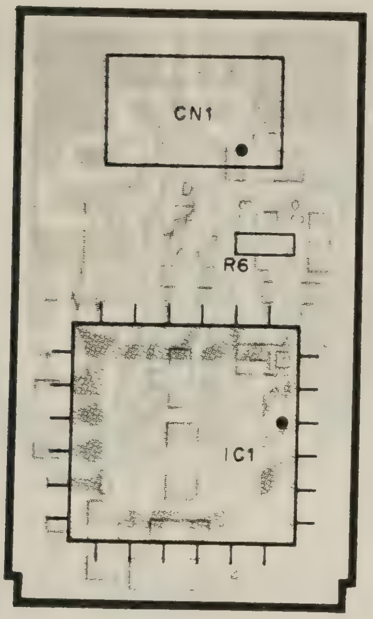
TSU-7 PARTS LIST

Ref. No	Address	Rart	Rarts No.	Description	Destination	Remarks
TSU-7 (X52-3170-00)						
			G10-0692-04	CUTTION		
			H21-0704-04	CUTTION		
X1			L78-0062-05	STAL (1MHz)		
IC1			FX365LS	IC		
D1			DAN202U	DIODE		
CN1			E40-5341-05			
VR1			R12-6526-05	TRIM. POT. (47K)		
R1			RK73BG1J274J	CHIP R J 270K		
R2			RK73BG1J824J	CHIP R J 820K		
R4			RK73BF1J103J	CHIP R J 10K		
R5			RK73BG1J105J	CHIP R J 1M		
R6			RK73BG1J473J	CHIP R J 47K		
C1			CK73GB1H471K	CHIP C K 470pF		
C2			C92-0521-05	CHIP TAN 20WV		
C4-6			CK73FB1E104K	CHIP C K 0.1UF		
C7			CK73GB1H471K	CHIP C K 470pF		
C8.9			CC73GCH1H221J	CHIP C J 220pF		

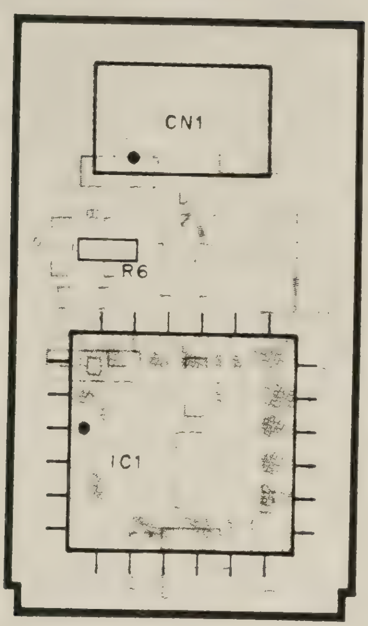
TSU-7 (CTCSS UNIT)

TSU-7 PC BOARD VIEWS

[Component side view]

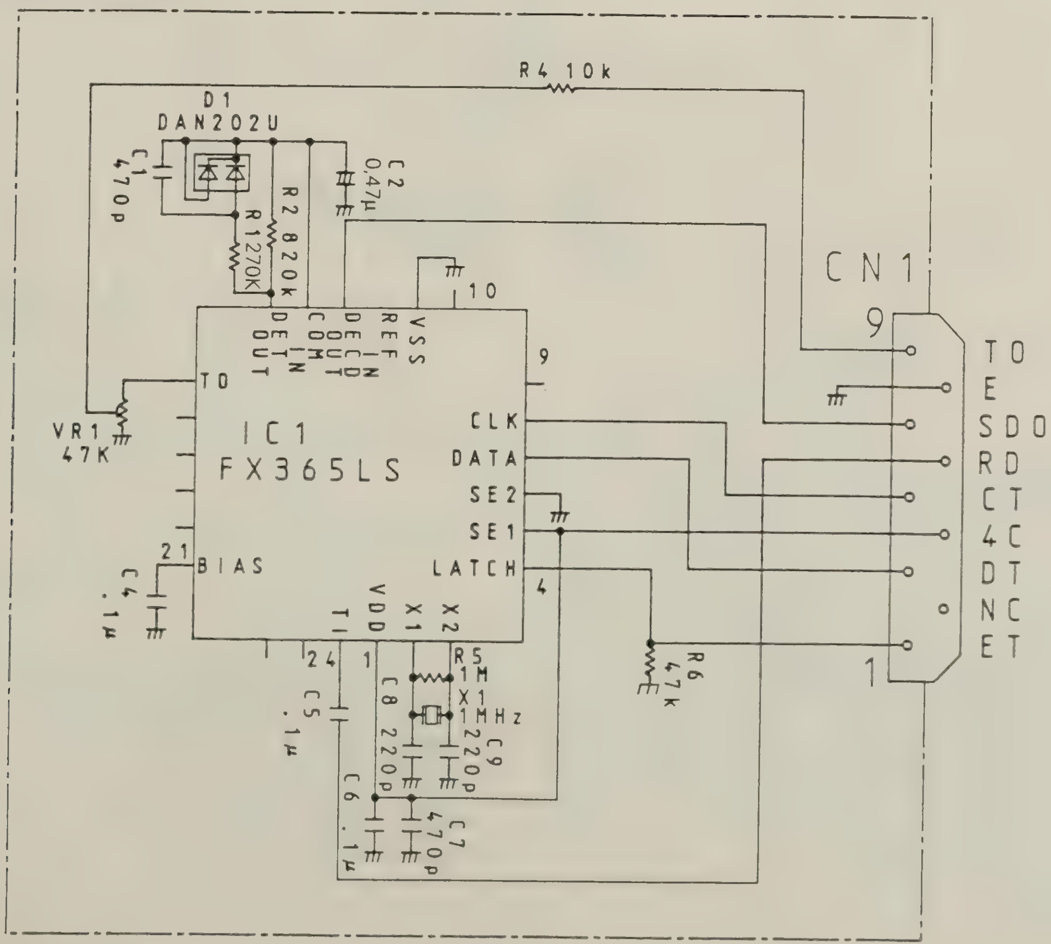


[Foil side view]



: Component side pattern : Foil side pattern

TSU-7 CIRCUIT DIAGRAM



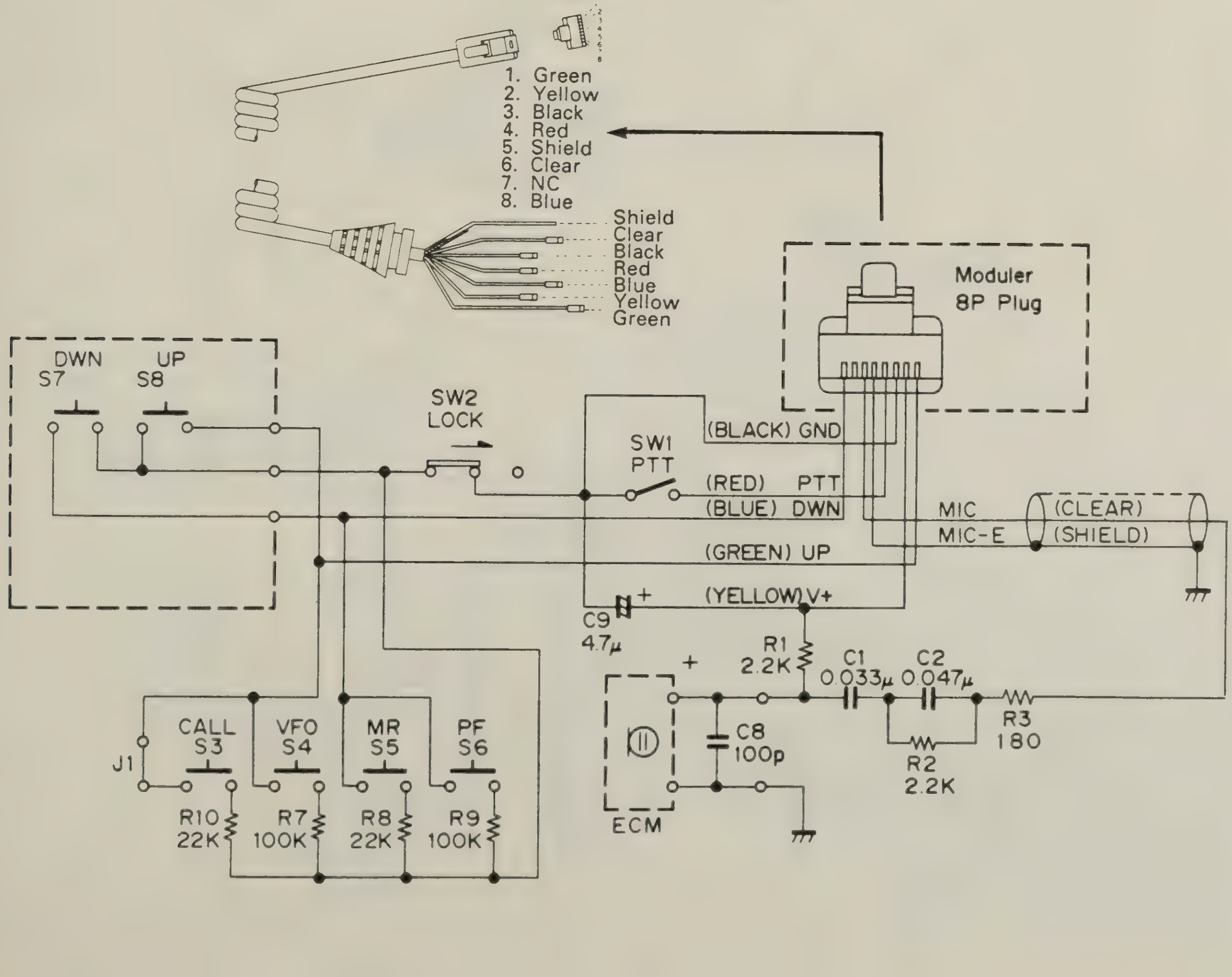
MC-45 (MULTI FUNCTION MICROPHONE)

EXTERNAL VIEW

PARTS LIST

Ref. No.	Address	New Parts	Parts No.	Description	Desti-nation	Re-marks
			A02-0896-08	CASE (FRONT)		
			A02-0900-08	CASE (REAR)		
			E30-3006-08	CURL CORD ASSY		
			G13-0933-08	CUSHION (UP,DWN)		
			K29-3165-08	KNOB PTT		
			K29-3168-08	KNOB UP		
			K29-3169-08	KNOB DWN		
			K29-3170-08	KNOB CALL,VFO, MR,PF		
			S59-1409-28	SWITCH ASSY UP,DWN		
S3-6			S40-1431-08	TACT SWITCH CALL,VFO, MR,PF		
S7,8		*	S40-1437-08	TACT SWITCH UP,DWN		
SW1			S50-1431-08	MICRO SWITCH LOCK		
SW2			S31-1422-08	SLIDE SWITCH LOCK		
			T91-0383-08	MICROPHONE ELEMENT		

SCHEMATIC DIAGRAM



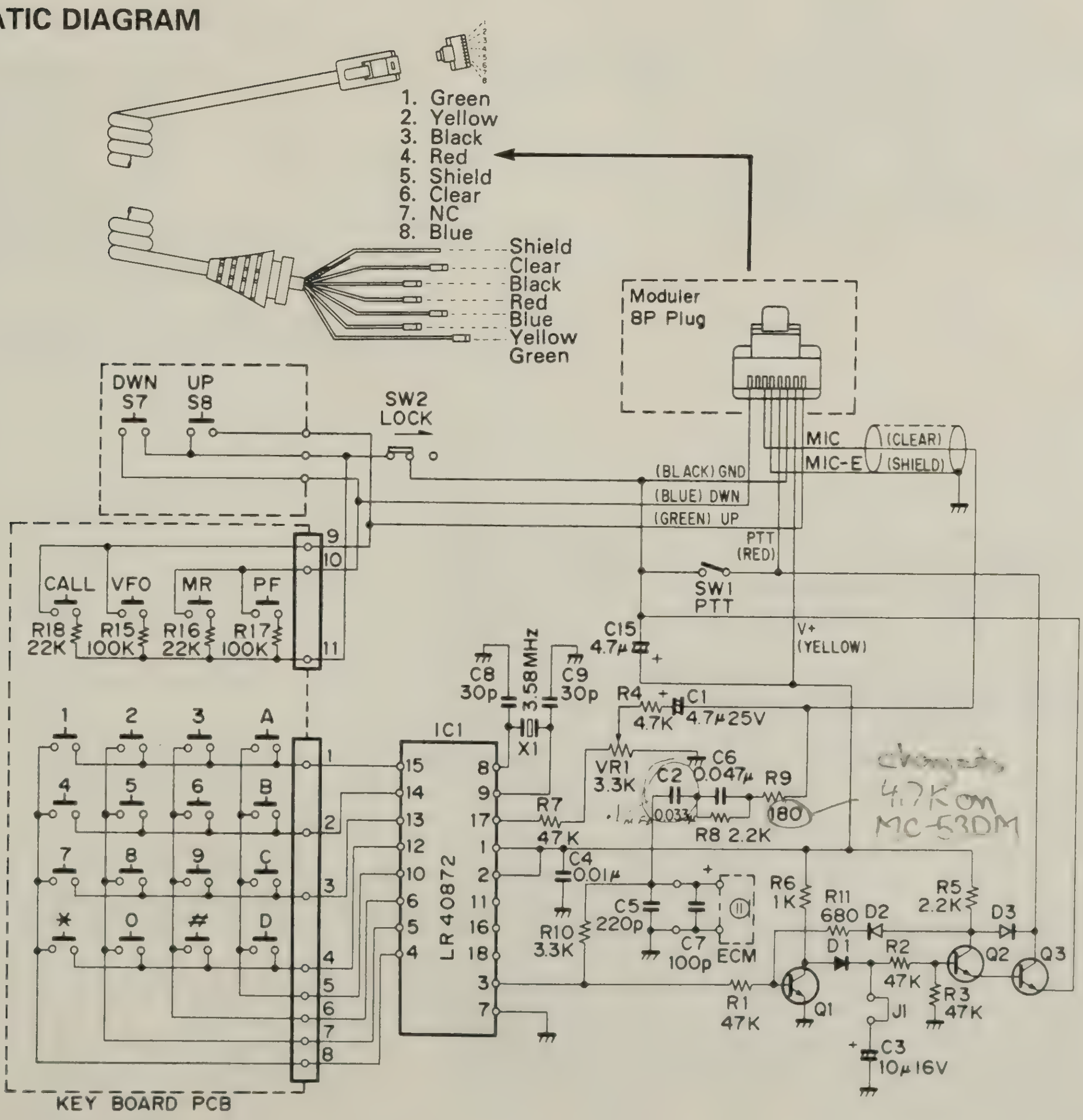
MC-45DM (MULTI FUNCTION MICROPHONE WITH AUTOPATCH)

EXTERNAL VIEW

PARTS LIST

Ref. No.	Address	New Parts	Parts No.	Description	Desti-nation	Re-marks
			A02-0898-08	CASE (FRONT)		
			A02-0901-08	CASE (REAR)		
			E30-3006-08	CURL CORD ASSY		
			G13-0933-08	CUSHION (UP,DWN)		
			K29-3165-08	KNOB PTT		
			K29-3167-08	KEY TOP DTMF		
			K29-3168-18	KNOB UP		
			K29-3169-18	KNOB DOWN		
			S59-1409-28	SWITCH ASSY UP,DWN		
S7,8		*	S40-1437-08	TACT SWITCH UP,DWN		
SW1			S50-1431-08	MICRO SWITCH PTT		
SW2			S31-1422-08	SLIDE SWITCH LOCK		
			T91-0393-08	MICROPHONE ELEMENT		

SCHEMATIC DIAGRAM



changes 4.7K on MC-53DM

SPECIFICATIONS

			144 MHz Band	440 MHz Band	1200 MHz Band
GENERAL	Frequency range MHz		144 ~ 148	438 ~ 450	1240 ~ 1300
	Mode		F3E(PM)		
	Antenna impedance		50Ω		
	Operating temperature		−20°C ~ +60°C (−4°F ~ +140°F)		
	Power requirements		13.8 VDC ± 15 % (11.7 ~ 15.8V)		
	Ground		Negative		
	Current drain	Transmit mode	Less than 11.5A	Less than 10.0A	Less than 6.0A
		Receiver mode	Less than 1.2A	Less than 1.2A	Less than 1.2A
	Frequency stability		± 10ppm		± 3ppm
	Dimensions (W×H×D)		150 × 50 × 175 mm		
	Weight		1.9 kg		
TRANSMITTER	Output power	HI	50W	35W	10W
		MID	10W	10W	—
		LOW	Approx. 5W	Approx. 5W	1W
	Modulation		Reactance modulation		
	Spurious radiation		Less than −60 dB		Less than −50 dB
	Maximum frequency deviation		±5kHz		
	Audio distortion (at 60% modulation)		Less than 3%		
	Microphone impedance		600Ω		
RECEIVER	Circuitry		Double conversion superheterodyne		
	Intermediate frequency 1st/2nd		10.7 MHz/455 kHz	21.6 MHz/455 kHz	59.7 MHz/455 kHz
	Sensitivity (12 dB S NAD)		Less than 0.16 μV (−10 dBμ)*		
	Selectivity −6 dB		More than 12 kHz		
	Selectivity −60 dB		Less than 24 kHz		Less than 36 khz
	Squelch sensitivity		Less than 0.1 μV (−14 dBμ)		
	Output (5% distortion)		More than 2 W (8Ω load) (5% distortion)		
	External speaker impedance		8Ω		

* 1240 MHz to 1260 MHz Less than 0.22 μV (−7 dBμ)

Notes:

1. Circuit and ratings are subject to change without notice due to advancements in technology.
2. Recommended duty cycle : 1 minute Transmit, 3 minutes Reception.

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